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Hepatitis B Infection and Immunity Among Sexually Transmitted Disease Clinic Patients: Implications for Vaccination Policy

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Background

Vaccination is recommended for sexually transmitted disease (STD) clinic clients. To develop a cost-effective vaccination policy, we determined the prevalence and predictors of hepatitis B infection and percentage of immunity among clients of Miami-Dade County Health Department (MDCHD) largest STD clinic.

Methods

All patients 18 years of age and older presenting for a check-up at the STD clinic between January and March, 2001, were eligible. Consenting patients were interviewed regarding potential risk factors for hepatitis and vaccination history, and blood was drawn for a hepatitis panel. Hepatitis B infection was defined as being antibody to hepatitis B core antigen (anti-HBc) reactive regardless of other hepatitis B serum marker results. Immunity to hepatitis B was defined as an antibody to hepatitis B surface antigen (anti-HBs) level of ≥10 mIU/mL. Risk factors associated with anti-HBc in the univariate analysis ($p< 0.1$) were entered into a stepwise logistic regression and retained if significant ($p< 0.05$).

Results

Study population

Of the 1365 eligible patients, 710 (52%) consented to participate. Of these, 28 had indeterminate results or insufficient blood sample leaving 682 for analysis. Of these, 405 (59.4%) were male, 328 (48.1%) were Hispanic, 254 (37.2%) were non-Hispanic black, 52 (7.6%) were Haitian, and 48 (7.0%) were non-Hispanic white or other race/ethnicity. The majority (55.3%) of the group was not born in the United States, and 239 (35.0%) did not graduate from high school. The median age was 31 with a range of 18 to 84 years.

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Inside this issue:

Hepatitis B Infection and Immunity Among Sexually Transmitted Disease Clinic Patients: Implications for Vaccination Policy	1
Influenza Virus Surveillance Summary Update	3
Selected Reportable Diseases/Conditions in Miami-Dade County, January 2002	5

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Table 1: Multivariate analysis of anti-HBc seroprevalence by client characteristics and risk factors for men and women, Miami-Dade County Health Department Sexually Transmitted Disease Clinic, 2001

Men (n=405)			Women (n=275)		
Characteristic	**Odds Ratio**	**95 % CI**	**Characteristic**	**Odds Ratio**	**95 % CI**
Race/Ethnicity			**History of needle stick injury**		
Non-Hispanic White	1.00		No	1.00	
Hispanic	2.12	0.59-7.61	Yes	9.10	1.27-65.44
Non-Hispanic Black	4.38	1.20-15.96	**Injection drug use***		
Haitian	12.80	2.70-60.62	No	1.00	
History of ever having sex with men			Yes	7.60	1.15-50.30
No	1.00		**Education level**		
Yes	4.78	2.55-8.95	At least High school	1.00	
History of jail/prison			< High school	2.75	1.39-5.43
No	1.00		**History of jail/prison**		
Yes	1.85	1.08-3.18	No	1.00	
Age per 5 years	1.45	1.29-1.63	Yes	2.26	1.09-4.66

*: two who reported "don't know" for injection drug use were not included.

Table 2: Anti-HBs status by anti-HBc status (n=682), Miami-Dade County Health Department Sexually Transmitted Disease Clinic, 2001

History of vaccination	Anti-HBs>=10 mIU/mL	Anti-HBs<10 mIU/mL	Total
Yes	38 (59.4%)	74 (15.9%)	112 (21.2%)
3 doses	22	12	34
2 doses	5	4	9
1 doses	8	50	58
Don't know	3	8	11
No	18 (28.1%)	293 (63.1%)	311 (58.9%)
Don't know	8 (12.5%)	97 (20.9%)	105 (19.9%)
Total	64 (100%)	464 (100%)	528 (100%)

Table 3: Anti-HBs status among anti-HBc negative clients by self-reported vaccination history (n=528), Miami-Dade County Health Department Sexually Transmitted Disease Clinic, 2001

Group (% anti-HBs positive)	3 doses, no screening	First dose with screen, 2nd and 3rd dose is anti-HBs negative	Screen, three doses only if anti-HBs negative
All clients (25%)	$6,975	$6,613	$6,031
Men reporting sex with men (41%)	$6,974	$5,869	$4,915

Hepatitis B infection

Seven (1.0%) of the participants were HBsAg-positive, indicating current infection; only one was aware of the infection. Of all participants, 154 (22.6%) were anti-HBc-positive, indicating previous infection; 6 (3.9%) were aware that they had had hepatitis B. Table 1 show the risk factors for previous infection (anti-HBc-positive) among men and women in the multivariate analysis.

Immunity and vaccination

Of the 682 participants, 172 (25.2%) were anti-HBs-positive, indicating immunity. However, only 64 (37.2%) of the anti-HBs-positive patients were anti-HBc-positive and therefore, were immune due to vaccination and not previous infection. Of all 682 participants, 130 (19.1%) reported a history of vaccination. When analyzing the results of anti-HBc negative participants, vaccination history did not correlate well with anti-HBs results (table 2). Of the 64 with serologic evidence of immunity, 18 (28.1%) stated that they had not been vaccinated. Of the 112 reporting a vaccination history, only 38 (33.9%) were immune.

Vaccination/screening strategies

Given $23.25 per dose cost for vaccine and $8 for testing, the lowest cost vaccination strategy for all clients as well as the subgroup men who have sex with men (anti-HBs positivity 41%) is to screen first and administer the subsequent three doses based on the screening results (table 3).

Conclusion

The prevalence of immunity was high among this population, mostly due to previous hepatitis B infection. Vaccine coverage was low and did not correlate well with anti-HBs results. Although the least expensive strategy is to screen for evidence of prior infection before initiating immunization, this must be balanced with missed opportunities to administer at least one dose of the vaccine.

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Influenza Virus Surveillance Summary Update

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Week ending February 9, 2002-Week 6

National report: During week 6 (February 3-February 9, 2002), 363 (17.5%) of 2,071 specimens tested by the World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories across the United States were positive for influenza. During the past three weeks (weeks 4-6) the highest proportion of positive influenza cultures (41%) were reported from the West South Central region of the United States (Arkansas, Louisiana, Oklahoma and Texas). Since September 30, a total of 42,409 specimens for influenza viruses have been tested and

4,151 (9.8%) specimens from 50 states were positive. Of the 4,151 isolates identified, 4,091 (99%) were influenza A viruses and 60 (1%) were influenza B viruses. One thousand two hundred and ninety-nine (32%) viruses were subtyped, 1,284 (99%) were influenza A (H3N2) and 15 were influenza A (H3N2) and 15 were influenza A (H1) viruses. So far this season, CDC has characterized 169 influenza A (H3N2) and A (H1) isolates antigenically. All viruses were similar to the flu A strains in the 2001-2002 vaccine. The proportion of patient visits to sentinel physicians for influenza-like illness (ILI) overall was 3.0%, which is above the national baseline of 1.9%. The proportion of deaths attributed to pneumonia and influenza as reported by the vital statistics offices of 122 U.S. cities was 7.4% during week 6. This percentage is below the epidemic threshold of 8.3% for this time. Influenza activity was reported as widespread in 11 states (Arizona, Colorado, Kansas, New Mexico, New York, Tennessee, Texas, Utah, Virginia and Washington), regional in 27 states (Arkansas, California, Connecticut, Delaware, Georgia, Idaho, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nevada, New Hampshire, North Carolina, Ohio, Oklahoma, Pennsylvania, South Dakota, Vermont, Washington and Wyoming) this week. Sporadic activity was reported from 10 states.

Florida: Influenza activity, calculated based on the proportion of patients with influenza-like illness (ILI) seeking care by physicians participating in the Florida Sentinel Physicians Surveillance Network was 1.49% this week, the highest reported level of activity so far this season. Influenza-like illness activity was detected in 16 of 24 participating counties from Escambia to Monroe. Higher flu activity than expected for this time of year (>2%) was reported by physicians in Brevard, Escambia, Hillsborough, Leon, Monroe, Palm Beach, Polk and Seminole Counties. Eighteen cases of influenza were laboratory confirmed this week. Influenza A (H3N2) was confirmed from Duval (2), Indian River (3), Lake (1), Leon (3), Levy (1), Osceola (1), Palm Beach (2), and Sarasota (1) Counties. Influenza A of unknown subtype was detected from patients in Hillsborough and Orange Counties. Positive rapid antigen tests were reported from Hillsborough County. Between September 4 and February 14, influenza A (H3N2) was isolated from 104 patients residing in Broward, Collier, Duval, Escambia, Hillsborough, Indian River, Lake, Leon, Levy, Marion, Monroe, Osceola, Palm Beach, Pinellas, Polk, Santa Rosa, Sarasota and St. John's Counties. Influenza A (H1N1) from 2 patients in Duval and Palm Beach Counties and influenza A of unknown subtype, was diagnosed in patients in Broward, Gadsden, Lee, Martin, Orange, Pinellas, Palm Beach and Hillsborough County. Influenza B has been recovered from patients in Broward (1), Hillsborough (2) and Palm Beach (1) Counties. In addition, positive rapid antigen tests were reported from Duval County, Escambia, Hillsborough, Palm Beach, Lee, Marion, Miami-Dade, Okaloosa, Pinellas and Volusia Counties.

Monthly Report
Selected Reportable Diseases/Conditions in Miami-Dade County, January 2002

Diseases/Conditions	2002 this Month	2002 Year to Date	2001 Year to Date	2000 Year to Date	1999 Year to Date	1998 Year to Date
AIDS *Provisional	105	105	105	131	94	109
Campylobacteriosis	2	2	5	N/A	0	2
Chancroid	0	0	0	0	0	0
Chlamydia trachomatis	318	318	211	328	331	181
Ciguatera Poisoning	0	0	0	N/A	0	0
Cryptosporidiosis	0	0	3	N/A	0	0
Cyclosporosis	0	0	0	0	0	0
Diphtheria	0	0	0	0	0	0
E. coli , O157:H7	0	0	0	0	0	0
E. coli , Other	0	0	0	0	0	0
Encephalitis	0	0	0	0	0	0
Giardiasis, Acute	2	2	2	N/A	3	2
Gonorrhea	148	148	165	233	263	115
Granuloma Inguinale	0	0	0	0	0	0
Haemophilus influenzae B (invasive)	0	0	1	0	0	0
Hepatitis A	0	0	8	N/A	2	1
Hepatitis B	1	1	1	N/A	0	0
HIV *Provisional	193	193	146	141	106	139
Lead Poisoning	9	9	18	N/A	N/A	8
Legionnaire's Disease	0	0	0	0	0	0
Leptospirosis	0	0	0	0	0	0
Lyme disease	0	0	0	0	0	1
Lymphogranuloma Venereum	0	0	0	0	0	0
Malaria	1	1	0	N/A	2	0
Measles	0	0	0	0	0	0
Meningitis (except aseptic)	0	0	0	0	0	0
Meningococcal Disease	2	2	1	N/A	0	0
Mumps	0	0	0	0	0	0
Pertussis	0	0	0	0	0	0
Polio	0	0	0	0	0	0
Rabies, Animal	0	0	0	0	0	1
Rubella	0	0	10	0	2	19
Salmonellosis	7	7	4	N/A	0	10
Shigellosis	7	7	0	N/A	2	0
Streptococcus pneumoniae, Drug Resistant	8	8	0	N/A	0	0
Syphilis, Infectious	13	13	11	10	10	1
Syphilis, Other	41	41	45	63	104	66
Tetanus	0	0	0	0	0	0
Toxoplasmosis	0	0	0	0	0	0
Tuberculosis *Provisional	13	13	11	15	0	22
Typhoid Fever	0	0	0	N/A	0	1
Vibrio , *cholera*	0	0	0	0	0	0
Vibrio , Other	0	0	0	0	0	0

* Data on AIDS are provisional at the county level and are subject to edit checks by state and federal agencies.
** Data on tuberculosis are provisional at the county level.