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***Brucella melitensis* in Broward County**

Holly J. Montejano, M.S., Patrick Jenkins, M.P.H., Danielle Stanek, D.V.M., John Livengood, M.D., M.Phil.

Introduction

On Friday, June 20, 2010, the Broward County Health Department (CHD) Epidemiology Program was notified of a suspected case of Brucellosis in a young woman, a healthcare worker of West Indian origin. Preliminary PCR confirmation was received from the Bureau of Laboratories in Jacksonville on Tuesday, June 29. On July 6, *Brucella melitensis* species confirmation was received. This species of *Brucella* is not present in animals in the U.S.; therefore, exposure most likely occurred during travel to an endemic country or via imported raw dairy products.

Background

Brucella melitensis is a zoonotic bacterial infection found in sheep and goats that can cause systemic disease in humans. If not treated, brucellosis can last months to years with serious consequences to various organ systems. The case fatality rate of brucellosis is low, approximately 2% or less, and is often due to complications from endocarditis. Recovery is possible with antibiotic treatment, but there is potential for relapse.

The *Brucella* bacterium generally does not survive in the environment for prolonged periods of time. Transmission commonly occurs through contact with infected animals or by ingestion of unpasteurized or undercooked contaminated food. People working in certain occupational settings (in endemic countries) have a higher risk of infection: dairy workers, veterinarians, microbiology laboratorians, kitchen workers, and abattoir workers¹. In addition, risk of transmission also exists through blood transfusions and organ transplants¹. Less frequently reported routes of exposure include sexual transmission² and breastfeeding^{3,4,5,6}.

Brucella melitensis is listed as a Category B bioterrorism agent⁷ due to the low infectious dose and the aerosol transmission potential when in pure culture, and rarely, in heavily contaminated environments.

Case Investigation

Following notification, the Broward CHD Epidemiology staff initiated an investigation and interviewed the patient on Wednesday, June 30. The patient reported feeling ill in early May 2010 with initial symptoms of urinary urgency, arthralgia, and malaise. In June, she developed night sweats, loss of appetite, and hepatosplenomegaly (physician diagnosed). Potential exposures included consumption of raw milk, imported cheese made with raw milk, and either domestic or imported raw ground beef; all reportedly purchased at a local outlet of a national grocery chain. The patient denied any occupational exposures at work, such as entering a laboratory while *Brucella* cultures were being studied, or having a break in personal protective equipment (PPE) while handling patient blood samples.

During the interview, it was learned that one of her two children may have been exposed to the infection from breastfeeding as she reported weaning the infant during the symptomatic period. She denied providing raw animal meat or milk to the children. Epidemiology staff provided education to the patient regarding the challenges of clinical assessment of brucellosis in children, and instructed her to watch for any change in health status in the child.

While the patient reported no overseas travel in the past six months, her husband had traveled in December 2009 to a country in Europe where there is a high risk for exposure to *Brucella melitensis*⁸. The patient reported that her husband did not bring home any food items and that he denied consuming any raw meat or milk while abroad. She declined to answer questions about the health of the husband, stating she was not comfortable doing this. The patient's husband also declined interview. The treating infectious disease physician was contacted by BCHD and reported that the spouse had complained of night sweats while present during a consult with the patient. The physician also reported that the patient and her husband consumed raw bison in addition to the food items mentioned above. It is noteworthy that if the husband became infected while traveling, sexual transmission of *Brucella* to his wife could have occurred.

The Centers for Disease Control and Prevention (CDC) Bacterial Special Pathogens Laboratory recommended that a child exposed via breast milk have *Brucella* serology and culture testing performed. Laboratory testing was offered to the patient's immediate family, but, as yet, they have declined. A religious exemption is noted on the older child's Florida SHOTS profile, and no profile exists for the younger child. This may explain the family's hesitation to pursue further testing by providing evidence of a general distrust of conventional medicine or belief in alternative medical and lifestyle practices.

Laboratory Exposures

Two laboratory workers handling the *Brucella* specimen associated with this case were reportedly exposed as they were not aware of the possible diagnosis, and aerosol precautions were not observed. It was later found that only one laboratory worker met the criteria for high-risk exposure. This individual has subsequently received prophylactic treatment and will adhere to the necessary follow-up testing according to the CDC guidelines.

Due to the *Brucella* exposure in the laboratory workers, informational materials were sent to all Broward County hospital infection control practitioners to be forwarded to their respective laboratory personnel, as well as to the commercial laboratories located in the county. This one-page fact sheet came from a January 18, 2008 *MMWR*⁹ report and serves as a reminder for

proper laboratory specimen handling techniques to help prevent future exposures in laboratory workers.

Environmental Health

The regional environmental epidemiologist was notified of the situation and the location where the food items were reportedly purchased. The Department of Agricultural and Consumer Services was notified of the suspected food items via the food complaint form. Unfortunately, little food tracking information (brand names, lot numbers, etc.) was available, thus limiting the ability for food trace-backs. However, the CDC is not aware of similar reports of brucellosis cases associated with mainstream commercial vendors. It is illegal to sell raw milk for human consumption in Florida due to the known disease agents that may be present in unpasteurized milk products. However, vendors are able to sell such products that are labeled for consumption by pets. The implicated store reportedly no longer sells this product but the product may continue to be available from other local sources.

Discussion

In this particular case, it is unclear exactly how transmission of *Brucella* occurred. The husband may have brought home unreported food items from his trip. If the husband became infected while traveling abroad, *Brucella* may have been sexually transmitted to the patient upon his return home as has been documented in the literature. Though the patient's husband had denied any symptoms to the Broward CHD, the infectious disease physician treating his wife reported that he had been experiencing night sweats. Due to the nature of this infection, and the fact that the patient had been breastfeeding her one-year-old child after she became ill, testing continues to be recommended for the child as well as the patient's husband. Additional strategies and suggestions for effectively conveying risk to those using alternative medical practices would be helpful.

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Holly Montejano is a Florida EIS Fellow with the Bureau of Epidemiology located in the Broward County Health Department. Mrs. Montejano can be contacted at 954-467-4700 ext 5583 or by email at Holly_Montejano@doh.state.fl.us. Patrick Jenkins is Epidemiology Program Manager for the Broward County Health Department. Mr. Jenkins can be contacted at 954-467-4700 ext 5575 or by email at Patrick_Jenkins@doh.state.fl.us. Dr. Danielle Stanek is a medical epidemiologist with the Bureau of Environmental Public Health Medicine. Dr. Stanek can be contacted at 850-245-4417 or by email at Danielle_Stanek@doh.state.fl.us. Dr. John Livengood is Epidemiology Director at Broward County Health Department. Dr. Livengood can be contacted at 954-467-4700 ext 5550 or by email at John_Livengood@doh.state.fl.us.

Hepatitis Lab Interpretations

April Crowley

The Hepatitis Prevention Program recently updated its *Hepatitis Test Results and Interpretations* chart. This one-page, two-sided diagram features results for hepatitis A (HAV), hepatitis B (HBV) and hepatitis C (HCV).

The major change was in the HCV interpretations replacing PCRs with NAT for HCV RNA, along with the definitions for these acronyms. To order lab interpretation sheets online, go to www.FlaHepatitis.org and click on the [Hepatitis Educational Materials Order Form](#).

Acronyms

Anti-HCV: Antibody to HCV
NAT: Nucleic Acid Testing
RIBA: Recombinant Immunoblot Assay
S/CO: Signal to Cut-Off Ratio
RNA: Ribonucleic Acid
ALT: Alanine Aminotransferase

(A copy of the interpretations chart follows as an appendix to this issue.)

April Crowley is the Health Educator for the Hepatitis Program Office of the Bureau of HIV/AIDS in the Division of Disease Control. Ms. Crowley can be contacted at 850-245-4444 ext 2580 or by email at April_Crowley@doh.state.fl.us.

New Regional Epidemiologist, Dr. Ann Schmitz

Dr. Ann Schmitz (D.V.M., A.M.) recently joined the Florida Department of Health's Bureau of Epidemiology as the new regional epidemiologist based in Miami at the Bureau of Laboratories. She replaces Tim Doyle who is now with the CDC in Mozambique. Prior to this appointment, she served as the senior staff epidemiologist with the CDC's Infectious Diseases Pathology Branch

(IDPB) since 2007. Areas of interest have included zoonotic diseases, unexplained respiratory infections, and sudden unexplained infant deaths. Prior to her appointment with IDPB, she spent two years as an Epidemic Intelligence Service Officer with the Enteric Diseases Epidemiology Branch following a two-year Emerging Infectious Diseases Laboratory Fellowship with the Rabies Team at the CDC. Dr. Schmitz practiced as a small animal emergency veterinarian in Detroit, Michigan following the completion of a small animal medicine and surgery internship. She completed her Doctorate in Veterinary Medicine from The Ohio State University in 2002 and a Masters in Population Genetics and Evolution at Washington University in St. Louis in 1997.

Florida Year-to-Date Mosquito-Borne Disease Summary Through September 18, 2010

Elizabeth Radke, M.P.H., Danielle Stanek, D.V.M., Carina Blackmore, D.V.M., Ph.D.



During the period from January 1 through September 18, 2010, the following arboviral activity was recorded in Florida.

Eastern Equine Encephalitis Virus (EEEV) Activity

Positive samples were obtained from four humans, 91 horses, 149 sentinel chickens, 30 live wild birds, and six mosquito pools in 45 counties.

West Nile Virus (WNV) Activity

Positive samples were obtained from six humans, seven horses, 177 sentinel chickens, and one live wild bird (flavivirus positive) in 23 counties.

St. Louis Encephalitis Virus (SLEV) Activity

No activity reported in 2010.

Highlands J Virus (HJV) Activity

Positive samples were obtained from 14 sentinel chickens in seven counties.

California Encephalitis Group Viruses (CEV) Activity

No activity reported in 2010.

Dengue Virus (DENV)

One case of dengue was reported as acquired in Broward County and 44 locally-acquired cases of dengue were reported as associated with Key West in Monroe County. Of these, 35 are Key West residents, eight are residents of other Florida counties, and one resides out of state. Ninety-eight imported cases with onset in 2010 in Florida residents were reported from 22 counties. Places of origin include Brazil, Columbia (8), Costa Rica (4), Dominican Republic (12), Ecuador, El Salvador, Grenada, Guatemala (2), Haiti (5), Honduras (6), Jamaica (4), Martinique, Nicaragua (4), Philippines, Puerto Rico (32), Venezuela (12), and Malaysia/Dubai/Bangladesh and Panama/Venezuela (slash indicates that cases traveled to more than one country).

Malaria

Eighty-four imported cases of malaria with onset in 2010 were reported in Florida residents from 20 counties. Places of origin included Angola, Dominican Republic, Ghana (4), Guyana, Haiti

(50), Honduras (3), India (6), Ivory Coast, Malawi (2), Nigeria (7), Philippines, South Africa, Togo, Uganda, West Africa, Zambia/South Africa, Africa, and unknown. Seventy-one (85%) were diagnosed with *Plasmodium falciparum*, eight (10%) with *Plasmodium vivax*, and the remainder were undetermined.

Dead Bird Reports

The Florida Fish and Wildlife Conservation Commission (FWC) collects reports of dead birds, which can be an indication of arbovirus circulation in an area. Since January 1, 2010, 257 reports representing a total of 808 dead birds (46 crows, 10 jays, 44 raptors, 708 others) have been received from 44 of Florida's 67 counties. Please note that the FWC collects reports of birds that have died from a variety of causes, not only arboviruses. Dead birds should be reported to www.myfwc.com/bird/.

See the following web site for more information

<http://www.doh.state.fl.us/Environment/medicine/arboviral/index.html>.

Elizabeth Radke is the Arthropod-borne Disease Surveillance Coordinator with the Bureau of Environmental Public Health Medicine. Ms. Radke can be contacted at 850.245.4444, ext 2437 or by email at Elizabeth.Radke@doh.state.fl.us. Dr. Danielle Stanek is a medical epidemiologist with the Bureau of Environmental Public Health Medicine. Dr. Stanek can be contacted at 850.245.4117 or by email at Danielle.Stanek@doh.state.fl.us. Dr. Carina Blackmore is the State Public Health Veterinarian and the Chief of the Bureau of Environmental Public Health Medicine. Dr. Blackmore can be contacted at 850.245.4732 or by email at Carina.Blackmore@doh.state.fl.us. The Bureau of Environmental Public Health Medicine is part of the Division of Environmental Health, Florida Department of Health.

Reportable Diseases in Florida

Up-to-date information about the occurrence of reportable diseases in Florida, based on the Merlin surveillance information system, is available at the following site: <http://www.floridacharts.com/merlin/freqrpt.asp>. Counts can be displayed by disease, diagnosis status, county, age group, gender, or time period.

Monthly Notifiable Disease Data

Table 1. Provisional Cases* of Selected Notifiable Diseases, Florida, August 1-31, 2010

Disease Category	Month				Cumulative (YTD)	
	2010	2009	Mean [†]	Median [‡]	2010	2009
A. Vaccine Preventable Diseases						
Diphtheria	0	0	0	0	0	0
Measles	0	0	0.2	1	1	5
Mumps	0	3	1.6	2	13	13
Pertussis	44	69	34.0	24	209	363
Poliomyelitis	0	0	0	0	0	0
Rubella	0	0	0	0	0	0
Smallpox	0	0	0	0	0	0
Tetanus	0	0	0.6	2	4	0
Varicella	30	23	N/A	N/A	717	917
B. CNS Diseases & Bacteremias						
Creutzfeldt-Jakob Disease	3	0	0.8	1	10	11
<i>H. influenzae</i> (invasive disease)	7	12	7.8	4	124	172
in those ≤5	1	1	2.8	3.5	19	21
Listeriosis	6	2	2.6	3	39	11
Meningitis (bacterial, cryptococcal, mycotic)	15	13	2.0	12	32	27
Meningococcal Disease	1	3	2.8	3	47	43
<i>Staphylococcus aureus</i> (VISA, VRSA)	1	1	0.2	1	2	5
Streptococcal Disease, Group A, (invasive disease)	17	25	21.8	23	38	53
<i>Streptococcus pneumoniae</i> (invasive disease)						
Drug resistant	25	16	36.4	40	586	543
Drug susceptible	26	21	31.4	33	475	489
C. Enteric Infections						
Campylobacteriosis	137	141	115.6	119	801	752
Cholera	0	0	0	0	0	0
Cryptosporidiosis	50	64	77.6	70	261	239
Cyclospora	3	5	6.8	6	55	31
<i>Escherichia coli</i> , Shiga toxin-producing (STEC)**	31	18	5.2	3	145	107
Giardiasis	247	170	134.8	130	1,360	1,304
Hemolytic Uremic Syndrome	0	0	0.8	1	6	2
Salmonellosis	844	763	615.0	620	3,478	3,369
Shigellosis	173	45	118.8	133	661	296
Typhoid Fever	2	5	3.4	4	13	13
D. Viral Hepatitis						
Hepatitis A	21	11	22.2	21	113	133
Hepatitis B, Acute	27	21	29.2	25	213	211
Hepatitis C, Acute	14	5	4.6	5	76	43
Hepatitis +HBsAg in pregnant women	32	35	38.8	35	296	378
Hepatitis D, E, G	0	0	0.2	1	1	3

* Confirmed and probable cases based on date of report as reported in Merlin
Incidence data for 2010 is provisional, data for 2009 was finalized on April 1, 2010

† Mean of the same month in the previous five years

‡ Median for the same month in the previous five years

** Includes *E. coli* O157:H7; Shiga toxin-positive, serogroup non-O157; and Shiga toxin-positive, not serogrouped

†† Includes neuroinvasive and non-neuroinvasive

N/A indicates that no historical data is available to calculate mean and median

Table 1. (cont.) Provisional Cases* of Selected Notifiable Diseases, Florida, August 1-31, 2010

Disease Category	Month				Cumulative (YTD)	
	2010	2009	Mean [†]	Median [¶]	2010	2009
F. Vector Borne, Zoonoses						
Dengue	47	1	3.6	3	122	18
Eastern Equine Encephalitis ^{††}	1	0	0.8	4	4	0
Ehrlichiosis/Anaplasmosis	3	1	0.6	2	12	10
Leptospirosis	0	0	0.2	1	0	0
Lyme Disease	21	21	11.0	10	76	55
Malaria	21	10	9.2	10	86	67
Plague	0	0	0	0	0	0
Psittacosis	0	0	0.2	1	0	0
Q Fever (acute and chronic)	0	0	0.2	1	1	1
Rabies, Animal	15	20	15.4	17	94	120
Rabies (possible exposure)	153	185	131.4	121	1,364	1,187
Rocky Mountain Spotted Fever	2	1	2.0	2	21	4
St. Louis Encephalitis ^{††}	0	0	0	0	0	0
Toxoplasmosis	1	0	0.8	1	6	2
Trichinellosis	0	0	0.2	1	0	0
Tularemia	0	1	0.2	1	0	1
Typhus Fever (epidemic and endemic)	0	1	0.2	1	2	1
Venezuelan Equine Encephalitis ^{††}	0	0	0	0	0	0
West Nile Virus ^{††}	2	0	3.6	3	2	0
Western Equine Encephalitis ^{††}	0	0	0	0	0	0
Yellow Fever	0	0	0	0	0	0
G. Others						
Anthrax	0	0	0	0	0	0
Botulism-Foodborne	0	0	0.2	1	0	1
Botulism-Infant	0	0	0	0	0	0
Brucellosis	2	1	0.6	1	14	5
Glanders	0	0	0	0	0	0
Hansen's Disease (Leprosy)	2	1	0.4	1	8	3
Hantavirus Infection	0	0	0	0	0	0
Legionella	22	15	15.8	15	125	103
Melioidosis	0	0	0	0	0	0
Vibriosis	21	10	14.0	12	84	54

* Confirmed and probable cases based on date of report as reported in Merlin

Incidence data for 2010 is provisional, data for 2009 was finalized on April 1, 2010

† Mean of the same month in the previous five years

¶ Median for the same month in the previous five years

†† Includes neuroinvasive and non-neuroinvasive

N/A indicates that no historical data is available to calculate mean and median

Note: The 2010 and 2009 case counts are provisional and are subject to change until the database closes. Cases may be deleted, added, or have their case classification changed based on new information and therefore the monthly tables should not be added to obtain a year to date number.

Please refer any questions regarding the data presented in these tables to Kate Goodin at Kate_Goodin@doh.state.fl.us or 850.245.4444 Ext. 2440.

Upcoming Events

Bureau of Epidemiology Monthly Grand Rounds

Date: Last Tuesday of each month

Time: 10 a.m.-11 a.m., E.T.

Location: Building 2585, Room 310A

Dial-In Number: 877.646.8762 (password: Grand Rounds)

October 26: “Drug-Resistant Tuberculosis” presented by Max Salfinger, M.D.

This Month on EpiCom

Christie Luce



EpiCom is located within the Florida Department of Health’s Emergency Notification System (FDENS). The Bureau of Epidemiology encourages *Epi Update* readers to register on the EpiCom system by emailing the Florida Department of Health Emergency Notification System Helpdesk at FDENS-help@doh.state.fl.us. Users are invited to contribute appropriate public health observations related to any suspicious or unusual occurrences or circumstances through the system. EpiCom is the primary method of communication between the Bureau of Epidemiology and other state medical and public health agencies during emergency situations. The following are titles from selected recent postings:

- Pertussis in a two-month-old infant, Clay County
- *Shigella sonnei* outbreak investigation at a local daycare center, Osceola County
- Key West-associated dengue, Sarasota County
- Rabid bat contact with unidentified children, Okeechobee County
- West Nile Virus (WNV) neuro-invasive disease, Orange County
- Imported dengue, Hillsborough County
- Imported malaria, St. Lucie County
- Suspected foodborne outbreak investigation, Alachua County
- Multi-state outbreak of human *Salmonella* Enteritidis infections associated with shell eggs
- Imported malaria, Collier County
- Meningococcal disease in a twenty-two-year-old, Miami-Dade County
- Investigation of a fatal case of *Vibrio vulnificus*, Hillsborough County
- Ciguatera outbreak investigation, Miami-Dade
- Imported dengue, St. Lucie County
- Two unrelated but similar cases of listeriosis, Escambia County
- Imported typhoid fever case in a food service employee, Palm Beach County
- Carbon monoxide (CO) poisoning, Collier County
- Third case of sporadic listeriosis in an elderly person, Escambia County
- Children exposed to mercury, Broward County
- Update: Shigellosis increase in Florida
- Fatal locally-acquired WNV infection, Orange County
- Imported dengue, Collier County
- Exposures to an elephant infected with *Mycobacterium tuberculosis*, Seminole County

- Probable meningococcal disease case in an infant with many contacts, Miami-Dade County
- Pertussis outbreak associated with residence shelter, Duval County
- Pertussis in an 11-week-old infant, Collier County
- Floridians with exposure to a positive tuberculosis patient via an international flight, Broward and Miami-Dade counties
- Influenza-like illnesses at a correctional institution, Miami-Dade County
- Rabies alert, Duval County

Christie Luce is the Surveillance Systems Administrator for the Bureau of Epidemiology. Ms. Luce can be contacted at 850-245-4418 or by email at Christie.Luce@doh.state.fl.us.

Epi Update is the peer-reviewed journal of the Florida Department of Health, Bureau of Epidemiology and is published monthly on the Internet. Current and past issues of Epi Update are available online at http://www.doh.state.fl.us/disease_ctrl/epi/Epi_Updates/index.html. The current issue of Epi Update is available online at http://www.doh.state.fl.us/disease_ctrl/epi/Epi_Updates/2010/September2010EpiUpdate.pdf.

For submission guidelines or questions regarding Epi Update, please contact Leesa Gibson at 850-245-4409 or by email at Leesa.Gibson@doh.state.fl.us.



Hepatitis Test Results “Profiles” and Interpretations*

Exposure Type or Risk Factors	Approximate Time from Exposure	Hepatitis C (anti-HCV)	Interpretation
Hepatitis C Risk Factor OR Blood Donor OR Abnormal ALT OR Acute Hepatitis	>6 months	Negative	Indicates immunocompetent patient without acute infection or possible immunosuppressed patient with acute infection.
	2-26 weeks	Negative or Indeterminate	Possible incubation stage. Retest 6 months after exposure.
	>6 months	Positive S/CO < 8.0	Supplemental testing recommended. (Automatic supplemental testing by the Bureau of Laboratories—results forwarded when available).
	>6 months	Positive S/CO ≥ 8.0	Indicates past or present infection. High s/co ratios usually confirm positive (≥95%) when supplemental testing is performed. Routine supplemental testing is not recommended for these samples. (Supplemental NAT for HCV RNA or RIBA testing performed by the Bureau of Laboratories ONLY on a case by case basis at the written request of provider).
<p style="text-align: center;">———— ACRONYMS ————</p> Anti-HCV: Antibody to HCV • NAT: Nucleic Acid Testing • RIBA: Recombinant Immunoblot Assay • RNA: Ribonucleic Acid	>6 months	Anti-HCV Positive NAT for HCV RNA Positive	Indicates past or present HCV infection. The detection of HCV RNA may be desired in evaluating patients for treatment and/or monitoring antiviral therapy.
	>6 months	Anti-HCV Positive NAT for HCV RNA Negative RIBA Positive	Indicates past or present HCV infection. HCV RNA is not detectable during all stages of infection.
	>6 months	Anti-HCV Positive NAT for HCV RNA Negative RIBA Negative	Antibody to HCV detected but not confirmed by a more specific assay. Possible false positive or virus at undetectable limit. Repeat in 6 months.
Exposure Type or Risk Factors	Approximate Time from Exposure	Hepatitis A (anti-HAV) Antibody	Interpretation
Hepatitis A Known Exposure OR Risk Factors	2–9 weeks	IgM Positive Total Antibody Positive	Early acute hepatitis A infection. Patient potentially infectious.
	3–6 months	IgM Positive Total Antibody Positive	Acute hepatitis A infection. No need for vaccine.
	Months to Years	Total Antibody Positive	Recovery state. Patient immune to hepatitis A. No need for vaccine.
Vaccine	Months to Years	Total Antibody Positive	Antibody to hepatitis A detected. Patient immune. Post-vaccination testing usually not recommended.

*Note: These results and interpretations are for serum tests for hepatitis, as performed by the State Lab. This chart developed by Florida Department of Health, Bureau of Laboratories and the Hepatitis Prevention Program.

Hepatitis Test Results and Interpretations*

Exposure Type or Risk Factors	Approximate Time from Exposure	Hepatitis B Surface Antigen (HBsAg)	Hepatitis B Surface Antibody (HBsAb)	Hepatitis B core-Total Antibody (anti-HBc)	Hepatitis B core-IgM Antibody (anti-HBc) IgM	Interpretation
Hepatitis B Vaccine	1–2 months after 3rd vaccine	Not done	Negative	Not done	Not done	Presumptive non-immunity to infection with HBV.
		Not done	Indeterminate	Not done	Not done	Indeterminate levels. Further assess patient's immune status by considering other clinical information.
		Not done	Positive	Not done	Not done	Hepatitis B surface antibody (anti-HBsAb) detected at ≥ 10 mIU/mL. Indicates immunity to infection with HBV.
Hepatitis B Known Exposure OR Risk Factors	< 3 months	Negative	Negative	Negative	Negative	Incubation period. Vaccinate. HBIG may be indicated.
	1–3 months	Positive	Negative	Negative	Negative	Indicates early acute stage of Infection or late incubation. Diagnose with aid of clinical presentation. Patients may be infectious.
	3 months	Positive	Negative	Positive	Positive	Indicates hepatitis B early acute infection. Patients may be infectious.
	3–6 months	Negative	Positive	Positive	Positive	Indicates early recovery and immunity. Infectivity unknown.
	≥ 6 months	Positive	Negative	Positive	Negative	Indicates chronic infection (chronic carriers).
	6–12 months	Negative	Positive	Positive	Negative	Indicates previous HBV infection and immunity; infectivity unknown.
	> 6 months	Negative	Negative	Positive	Negative	"Core Alone" May be a false positive result; window phase of resolving acute infection; late immunity stage; or unresolved infection in late or low grade state. Patient should not give blood.
Years	Negative	Positive	Positive	Negative	Indicates recovery. Immune to reinfection.	

*Note: These results and interpretations are for serum tests for hepatitis, as performed by the State Lab. This chart developed by Florida Department of Health, Bureau of Laboratories and the Hepatitis Prevention Program.