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## Report on the Enhanced Surveillance for Chlamydia in Women - South Carolina, 1998-2002

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### Extent of Chlamydia Problem

Chlamydia remains a significant health threat among women and adolescents. Most estimates predict that 1 in 20 sexually active woman of childbearing age or 1 in 10 adolescent girls are infected with chlamydia. In fact, 90% of all reported cases are in individuals less than 24 years of age. Unfortunately, 60 – 80% of infected women have no symptoms, and therefore are not aware of their infection and may not seek health care.

Chlamydia is the most commonly reported sexually transmitted infection among women in the United States (US). The southeast led the nation in chlamydia prevalence in 2002. For example, there were 451.1 cases/100,000 persons diagnosed in the U.S. but 604.3 cases/100,000 persons diagnosed in South Carolina (SC) in that year. Because of this high prevalence in our state, the SC Department of Health and Environmental Control (DHEC) began screening at sentinel sites in 1996, and implemented statewide screening by 1998.

When diagnosed, chlamydia can be easily treated and cured. An untreated infection has severe and costly complications including pelvic inflammatory disease (PID), ectopic pregnancy, infertility, chronic pelvic pain and adverse pregnancy outcomes. In addition, because this is an inflammatory condition, an untreated woman is at increased risk of acquiring HIV via sexual transmission from an HIV-infected sex partner.

### Addressing the Problem

In recognition of this major public health problem, SC participates in the Region IV Chlamydia Prevention Project (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, and Tennessee), a publicly funded program to support chlamydia screening primarily in family planning (FP) clinics, but also sexually transmitted disease (STD) clinics, prenatal clinics, jail, juvenile detention centers, and other sites.

All county health departments follow the state STD Program Standing Orders for treatment, and partner treatment

*(see CHLAMYDIA on page 3)*

## West Nile Virus - 2003 Summary and the Upcoming Season

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In 2003, South Carolina recorded six human cases of West Nile Virus (WNV). Surveillance numbers for other WNV positives in 2003 include: 282 birds, 54 equine, 3 mosquito pools, and 1 alpaca. See table on page three for human case description.

Because of the long stretch of warm weather in spring and fall, infected mosquitoes have a longer window to spread the disease in South Carolina. The first human WNV case in South Carolina during 2003 was also the first recorded case in the country last year. The last case of the season in SC occurred in late November. Activity has already been recorded for 2004 in some parts of the country.

Though most infected individuals are asymptomatic, roughly 20 percent show self-limited viral symptoms of fever, malaise, and muscle aches lasting several weeks. According to CDC guidelines, diagnosis of WNV infection is based on a high index of clinical suspicion and obtaining specific laboratory tests.

- WNV, or other arboviral diseases such as St. Louis encephalitis, should be strongly considered in adults >50 years who develop unexplained encephalitis or meningitis in summer or early fall.
- The local presence of WNV enzootic activity or other human cases should further raise suspicion.
- Obtaining a recent travel history is also important.

*(see WEST NILE VIRUS page 3)*

*INSIDE THIS ISSUE*

## Update on Foodborne Illness in S.C.

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The Centers for Disease Control and Prevention (CDC) estimates that each year 76 million people get sick, more than 300,000 are hospitalized, and 5,000 die as a result of foodborne illnesses. With an increase in travel and outdoor-related activities in the upcoming summer months, ideal conditions for the growth and proliferation of the foodborne pathogens are enhanced. Vigilance for foodborne illness is especially important in diagnosing gastrointestinal illness.

Physicians play a vital role in alerting the public health system about a potential foodborne outbreak by recognizing suspicious symptoms, disease clusters, and etiologic agents, and reporting illnesses to DHEC. Proper collection of stool specimens will also aid in diagnosis. Close collaboration between the private and public health sectors is critical to the foodborne outbreak investigation process. This close working relationship between South Carolina providers and DHEC has resulted in many successful investigations and identification of causative organisms in foodborne illness over the past few months. Among these are the following:

- In October 2003, a cluster of *Salmonella Enteritidis* was traced back to a large institutional setting, thanks to astute local providers who submitted stool cultures to the DHEC Bureau of Laboratories for Pulsed Field Gel Electrophoresis (PFGE) testing.

- In November 2003, an outbreak of Noro virus (formerly known as Noro-like virus) associated with a medical seminar involving attendees from all over the southeast was identified due to the timely collection of stool specimens for culture and epidemiological investigation.

- In January 2004, an alert emergency department physician contacted DHEC regarding a cluster of diarrheal illnesses seen in teenagers. This timely notification led to the identification of an outbreak of *Staphylococcus aureus* related to lasagna served in an institutional setting.

- In March 2004, a large outbreak of foodborne illness caused by *Clostridium perfringens* in a catered meal was successfully identified due to the timely collection and PFGE testing of stool specimens and food samples.

A quick reference guide for foodborne etiological agents is included on page six of this issue. For consultation regarding foodborne illnesses, please contact your local health department or the DHEC Division of Acute Disease Epidemiology at (803) 898-0861.

A guide outlining sample collection and testing is available on our web page at:
http://www.scdhec.gov/hs/diseasecont/disease.htm

### Vibrio vulnificus

*Vibrio vulnificus* is a rare but potentially deadly disease associated with the consumption of raw and undercooked shellfish. Infections are seasonal; over 85% occur between May and October. Environmental factors, such as warm water and moderate salinity, can increase the number of *V. vulnificus* organisms in shellfish. In 2003, three cases of *Vibrio vulnificus* were reported to DHEC. Two of the cases were fatal. This article is meant to provide healthcare providers with information regarding *Vibrio vulnificus* and with tips to advise patients who have underlying risk factors for the disease.

*Vibrio vulnificus* is a naturally occurring estuarine organism. Shellfish, such as oysters, which feed by filtering seawater that may contain *Vibrio vulnificus* are likely to be infected with the organism. This is especially true of shellfish harvested from the Gulf Coast region, where the majority of cases in the United States occur. Since much of the shellfish imported into South Carolina comes the Gulf, *Vibrio vulnificus* is a significant concern to our residents and tourists.

*Vibrio vulnificus* may cause vomiting, diarrhea, and abdominal pain among healthy people who eat contaminated seafood. However, in patients with existing illness or those who are immunocompromised, *Vibrio vulnificus* can lead to septicemia, causing a severe and life-threatening illness. Vibrio vulnificus bloodstream infections are fatal about 50% of the time. Persons at high risk for *Vibrio vulnificus* infection are those with liver disorders (e.g. cirrhosis, hemochromatosis, chronic hepatitis), diabetes, stomach disorders, cancer, HIV/AIDS, and alcohol abuse, as well as those with a weakened immune system due to a variety of medical treatments, such as chemotherapy. Physicians are encouraged to warn their patients with these risk factors to avoid eating raw or undercooked shellfish. South Carolina is one of twenty states that require reporting of *Vibrio* infections. Reports of *Vibrio* cases can be phoned to your local health department or submitted by a DHEC Disease Report Card.

Furthermore, food safety education is a critical part of the prevention of foodborne illness. DHEC has developed a brochure on *Vibrio vulnificus*, which is available at your local county health department or refer to the following sources for more information and educational materials:

Partnership for Food Safety Education
http://www.fightbac.org

CDC's Food Safety Office
http://www.cdc.gov/foodsafety/

FDA Center for Food Safety and Applied Nutrition
http://www.cfsan.fda.gov

Food Safety.gov provides links to selected government food safety-related information
http://www.foodsafety.gov

*( see FOODBORNE ILLNESS - page 6)*

*(WEST NILE VIRUS - continued from page 1)*

Updated information on clinical presentation, diagnostic testing available through DHEC, specimen submission and reporting, and links to other sources are available on the DHEC website at http://www.scdhec.gov/news/westnile/index.htm

A notable change from last year's guidelines involves the specimen size required for testing. Specimen size has increased from 1.0 cc to 1.5cc for CSF samples sent to commercial and private labs. The increase will ensure sufficient amount for additional verification testing by the DHEC lab for suspect West Nile encephalitis cases.

**Submitting Specimens and Reporting WNV Suspects and Cases:** Physicians should contact their local County Health Department's Epidemiology staff or the Division of Acute Disease Epidemiology at 803-898-0861 or 888-847-0902 (after hours and on weekends) to report confirmed or suspect cases of WNV and to request laboratory testing by SC DHEC. For patients meeting the clinical criteria, arrangements can then be made for WNV testing by the DHEC Laboatory.

| WNV Human Cases by County 2003 | | |
|---|---|---|
| 1 elderly male | WN fever | Oconee |
| 2 adult males | Meningoencephalitis | Lexington |
| 1 adult female | Meningoencephalitis | Berkley |
| 1 adult male | WN fever | Orangeburg |
| 1 adult male | WN fever | Jasper |

*(CHLAMYDIA continued from page 1)*

and referral. A specially designed lab reporting form was completed for each woman and some of the information obtained is being presented here.

## Primary Objectives

The objective of this ongoing enhanced surveillance system program is to determine the prevalence of chlamydia in women attending DHEC FP and STD clinics and to monitor the epidemiologic trends. We also examined the potential impact of this statewide screening and treatment on the incidence of PID in SC.

## Methods

Following the Center for Disease Control and Prevention (CDC) recommendations, all women were tested who presented to DHEC FP and STD clinics for care and were <24 years old and also women who were >25 years old with symptoms or any of the following risk factors: history of STD, multiple partners, recent new partner or sex without a condom. DHEC provided treatment and partner referral for those women with positive test results. Of all women, approximately 70% attend the FP clinic & 30% attend the STD clinic. The racial/ethnic mixture is 55% black, 40% white, and 5% Hispanic.

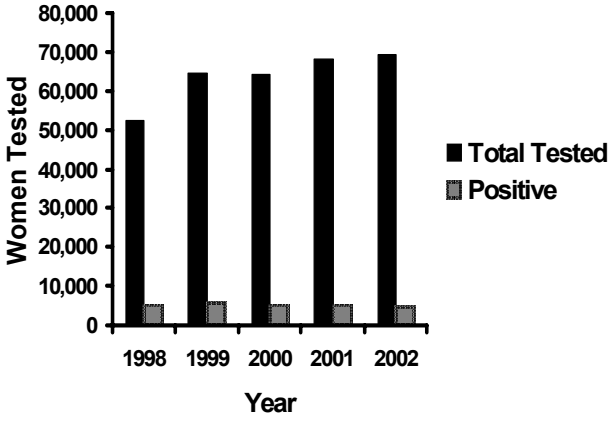
Gen-Probe DNA nucleic acid hybridization assay for all women tested was done at the SC Public Health laboratory and both positive and negative results were reported. Women with indeterminate or unsatisfactory results were excluded from the final data analysis.

We defined a case as a positive chlamydia test result in a woman who attended a DHEC FP/STD clinic during 1998-2002 and met criteria for testing.

The data source for PID incidence was obtained from the statewide Hospital Inpatient Discharge Database and the Emergency Department (ED) Database and the SC Budget and Control Board collect this information routinely. Any primary diagnosis of PID during 1998-2002 in a woman residing in SC was counted.

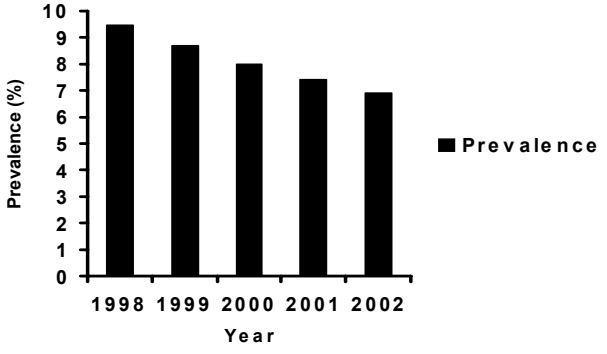
### Figure 1. Chlamydia Tests Performed Yearly

1) The number of women increased each year from 1998 to 2002.
2) The number of positive results obtained has remained relatively constant among all groups.




### Figure 2. Chlamydia Prevalence by Year

Prevalence rates for chlamydia have continued to decline since the inception of the screening and treatment program.

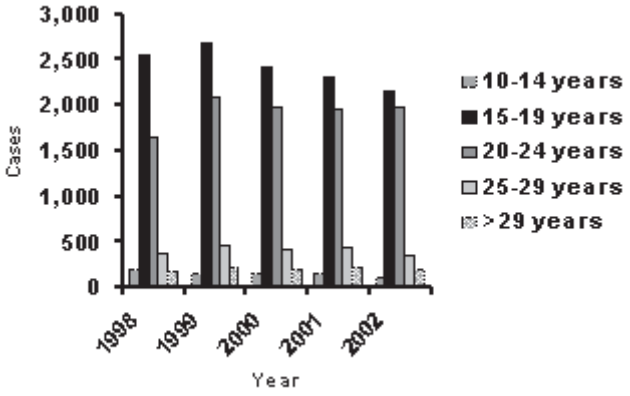



*(see CHLAMYDIA page 4)*

*(CHLAMYDIA continued from page 3)*

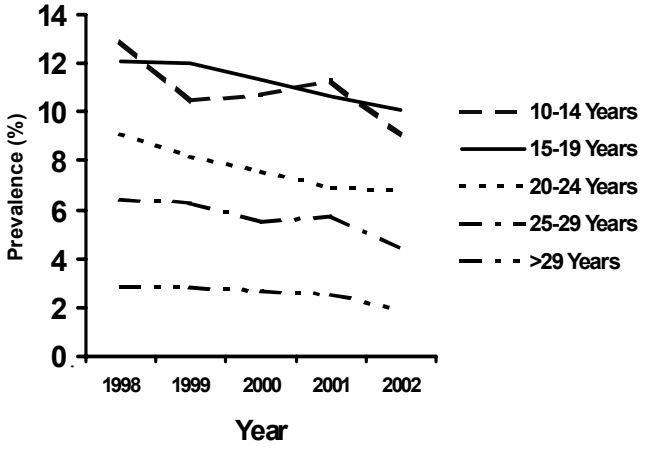
### Figure 3. Chlamydia Cases by Age Group

The 15-19 year age group and the 20-24 year age group, represents the largest numbers of women screened and treated.



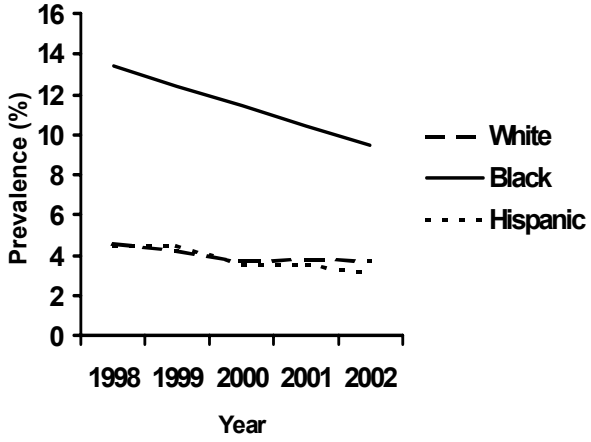

### Figure 4. Chlamydia Prevalence by Age Group

1) The age group <19 years has the highest prevalence.
2) Prevalence continues to decrease in the 20-24 year age group.
3) Older age group (>29 years) has the lowest prevalence.



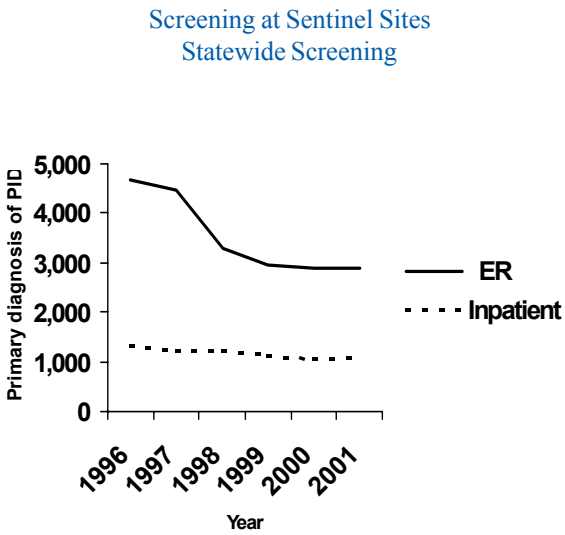

### Figure 5. Chlamydia Prevalence by Race/Ethnicity

1) The prevalence has decreased for blacks from 1998 to 2002.
2) The prevalence among black women seen in DHEC clinics is higher than for white/Hispanic women.




### Figure 6. Impact of Chlamydia Screening on PID

1) Chlamydia screening at sentinel sites may account for the initial decline in incidence of ED PID diagnoses.
2) Further decline of ED PID diagnoses occurred with implementation of statewide screening.
3) The plateau in ED PID diagnoses may be due to the other causes of PID which were not investigated as part of this study.




*(see CHLAMYDIA page 5)*

*(CHLAMYDIA continued from page 4)*

### Limitations of the Data

Specifically, data are limited to women attending DHEC clinics only. In particular, chlamydia prevalence in this study underestimates overall SC prevalence. Also, chlamydia rates in age and racial/ethnic subgroups may not be generalizable to other populations in SC.

We are further limited in our inferences since the PID data source cannot identify DHEC attendees and is limited to diagnoses made in the ED/inpatient setting.

### Conclusions

1) Chlamydia prevalence and PID incidence in SC women declined during 1998 to 2002.
2) Chlamydia infection rates were highest in 10-19 year age group and in black women.
3) Universal screening in women aged <24 years at DHEC FP/STD clinics is effective in decreasing chlamydia prevalence.
4) Expansion of screening from sentinel sites to statewide program further contributed to decreased prevalence.

### Summary

The data outlined in this article provides convincing evidence that widespread screening and treatment of this infection can reduce the prevalence of chlamydia in SC and the consequent complications. DHEC strongly recommends chlamydia screening of sexually active women aged <24 years in non-DHEC healthcare settings as part of routine annual examination. DHEC will continue to promote targeted prevention efforts for young women and black women, because chlamydia prevalence remains high in these groups.

The information provided in this enhanced surveillance for chlamydia with screening and treatment is more complete than the already existent passive surveillance system. The latter has been the standard for years and is required by DHEC SC Code of Law 44-1-80 and Regulation 61-20 for the reporting of communicable diseases. The passive system includes both men and women diagnosed with chlamydia but are limited in that some cases are likely tested only if symptoms are present. It also depends on timely reprting from laboratories of positive cases. In addition, the passive reporting system is not representative of the entire SC population as it only includes reports of positive tests of patients from all providers, but does not provide for comparative studies, any information about those individuals who test negative. The enhanced surveillance system in the DHEC clinices offers the advantage of 100% reporting of both positive and negative results to allow for calculation of prevalence.

The program would benefit from increased funding to allow expansion to other at risk groups. In 2001 the program was expanded to include testing in men and is greatly facilitated by the availability of urine-based testing. Up to 50% of men who are infected with chlamydia are asymptomatic and thus there is a large number of unidentified, infected individuals who are capable of transmitting the infection to their sexual partners. These urine-based tests will also allow diagnosis in places where it is difficult to performed a pelvic examination, such as in a community outreach setting in high prevalence areas.

Altogether, this enhanced screening and surveillance is providing a significant impact on the prevalence of chlamydia and the incidence of PID in South Carolina.


## Ask Epi

Here in the Division of Acute Disease Epi, we receive questions on a regular basis from providers regarding epidemiology and public health issues. We recognize that some of the questions may be of interest for a wider audience, so we are introducing an **"Ask Epi"** column to Epi Notes. A few questions will be selected and included in each issue with responses from our medical consultants.

Please email questions to: AskEpi@sc.dhec.gov. Please note that emails sent to this address will not take the place of consultations with DHEC public health professionals regarding specific cases or issues.

**QUESTION: IgM Positive or Not?** Our practice recently saw a pre-school child with a febrile rash illness for whom diagnostic evaluation included a test for measles IgM antibodies. The private lab which handles our specimens reported the IgM test as positive, but the reference DHEC lab reported a negative IgM on a repeat serum drawn four days later by a public health nurse who was following-up on the presumptive diagnosis of measles. This suggests that the initial positive IgM was a "false-positive". Please comment!

**ANSWER provided by Eric Brenner, MD:** For many diseases IgM antibodies constitute the early immunologic response and a positive IgM result thus often assists clinicians not only in making a diagnosis but in confirming the recent onset of infection and/or illness. In addition, for purposes of public health surveillance, the detection of IgM antibodies is often an essential prerequisite to the "case confirmation process" which is at the basis for reporting communicable disease incidence from SC DHEC to the US Centers for Disease Control (CDC) — a process essential for monitoring communicable disease trends in the United States. For example, positive IgM antibody test results are part of the formal "case definitions" used for arbovirus infections

*(see ASK EPI page 7)*

The following table lists some etiologic agents to consider for various manifestations of foodborne illness. This table is contained in *Diagnosis and Management of Foodborne Illnesses: A Primer for Physicians and Other Health Care Professionals*. A free copy of the primer is available at:
http://www.ama-assn.org/ama/pub/category/3629.html

| Clinical Presentation | Potential Food-Related Agents to Consider |
|---|---|
| Gastroenteritis (vomiting as primary symptom; fever and/or diarrhea also may be present) | Viral gastroenteritis, most commonly rotavirus in an infant or norovirus and other caliciviruses in an older child or adult; or food poisoning due to preformed toxins (eg, vomitoxin, *Staphylococcus aureus* toxin, *Bacillus cereus* toxin) and heavy metals. |
| Noninflammatory diarrhea (acute watery diarrhea without fever / dysentery; some patients may present with fever)* | Can be caused by virtually all enteric pathogens (bacterial, viral, parasitic) but is a classic symptom of:<br>Enterotoxigenic *Escherichia coli*<br>*Giardia*<br>*Vibrio cholerae*<br>Enteric viruses (astroviruses, noroviruses and other caliciviruses, enteric adenovirus, rotavirus)<br>*Cryptosporidium*<br>*Cyclospora cayetanensis* |
| Inflammatory diarrhea (invasive gastroenteritis; grossly bloody stool and fever may be present)† | *Shigella* species<br>*Campylobacter* species<br>*Salmonella* species<br>Enteroinvasive *E. coli*<br>Enterohemorrhagic *E. coli*<br>*E. coli* O157:H7<br>*Vibrio parahaemolyticus*<br>*Yersinia enterocolitica*<br>*Entamoeba histolytica* |
| Persistent diarrhea (lasting >14 days) | Prolonged illness should prompt examination for parasites, particularly in travelers to mountainous or other areas where untreated water is consumed. *Consider Cyclospora cayetanensis, Cryptosporidium, Entamoeba histolytica*, and *Giardia lamblia.* |
| Neurologic manifestations (eg, paresthesias, respiratory depression, bronchospasm, cranial nerve palsies) | Botulism (*Clostridium botulinum* toxin)<br>Organophosphate pesticides<br>Thallium poisoning<br>Scombroid fish poisoning (histamine, saurine)<br>Ciguatera fish poisoning (ciguatoxin)<br>Tetradon fish poisoning (tetrodotoxin)<br>Neurotoxic shellfish poisoning (brevitoxin)<br>Paralytic shellfish poisoning (saxitoxin)<br>Amnesic shellfish poisoning (domoic acid)<br>Mushroom poisoning<br>Guillain-Barre syndrome (associated with infectious diarrhea due to *Campylobacter jejuni*) |
| Systemic illness (eg, fever, weakness, arthritis, jaundice) | *Listeria monocytogenes*<br>*Brucella* species<br>*Trichinella spiralis*<br>*Toxoplasma gondii*<br>*Vibrio vulnificus*<br>Hepatitis A and E viruses<br>*Salmonella* Typhi and *Salmonella* Paratyphi<br>Amebic liver abscess |

*Noninflammatory diarrhea is characterized by mucosal hypersecretion or decreased absorption without mucosal destruction and generally involves the small intestine. Some affected patients may be dehydrated because of severe watery diarrhea and may appear seriously ill. This is more common in the young and the elderly. Most patients experience minimal dehydration and appear mildly ill with scant physical findings. Illness typically occurs with abrupt onset and brief duration. Fever and systemic symptoms usually are absent (except for symptoms related directly to intestinal fluid loss).

†Inflammatory diarrhea is characterized by mucosal invasion with resulting inflammation and is caused by invasive or cytotoxigenic microbial pathogens. The diarrheal illness usually involves the large intestine and may be associated with fever, abdominal pain and tenderness, headache, nausea, vomiting, malaise, and myalgia. Stools may be bloody and may contain many fecal leukocytes.

*( FOODBORNE ILLNESS continued from page 2)*

*(ASK EPI continued from page 5)*

(including WNV), measles, mumps, rubella, hepatitis A and hepatitis B (IgM anti-HBcAg) (1,2). Nonetheless, as your case illustrates, IgM tests, like all tests, are not perfect and may give false positive results. This point is also illustrated through the following two brief case reports.

**Case 1**: A 39 year old male from Lexington County had onset of fever, malaise, and myalgia in summer 2003 at a time when WNV was very much in the news. Diagnostic evaluation included a test for WNV IgM which was reported as positive by a private laboratory. A repeat test performed at the DHEC laboratory was IgM negative. At the same time the patient's febrile illness persisted longer than would be expected for "West Nile Fever". It was concluded that the patient did not have an acute WNV syndrome and should not be counted as a SC case or reported to CDC.

**Case 2:** An asymptomatic 32 year old female from Richland County was tested in the summer of 2003 for hepatitis B surface antigen as part of a routine pregnancy evaluation. The test for HBsAg was performed as part of a "hepatitis panel" which reported a positive test for IgM antibodies to the hepatitis A virus. A repeat IgM anti-HAV test at the DHEC laboratory was reported as "equivocal". Liver function tests performed at the same time were all within normal limits. Further questioning revealed that five months earlier, the patient, her husband and two young daughters had experienced a "viral syndrome" which, while not specific for any particular illness, was compatible with a mini intra-family-outbreak of hepatitis A. It was concluded that the patient did not have acute hepatitis A, and that it was possible — though not confirmed — that traces of IgM remained in her blood from an acute HAV infection she had had at the beginning of the year. Thus the patient's contacts did not need to receive prophylactic IG, she was not counted as a case, and not reported to CDC.

**Comment:** False positive IgM tests may occur for a number of reasons:

- recent vaccination - for example recent administration of live attenuated MMR vaccine would produce IgM antibodies against measles, mumps and rubella. A febrile rash illness occurring two or three months later might thus, because of the persisting IgM, be misconstrued as measles unless a careful history had obtained information about the recent MMR vaccination.
- unusually long persistence of IgM antibodies: for example it is now recognized that IgM in some arbovirus infections, including WNV, can persist not just for a few weeks or months, but even for the better part of a year or more. Thus it might be wrongly concluded that a patient had acute West Nile Fever because of a clinically compatible illness accompanied by a positive WNV IgM test, whereas in fact the IgM may simply have resulted from an asymptomatic WNV infection acquired months before during the preceding year's mosquito season.
- IgM tests, like all other tests, are not 100% specific, and because of immunologic cross-reactions, problems with laboratory technique, and/or other sometimes poorly understood factors, may simply yield positive results when they ought not too. While not frequent, such occurrences are well documented in the literature (3-6).

Since most positive IgM tests performed by competent laboratories are undoubtedly true positives, there is clearly no need to confirm all positive results. In general confirmatory testing is desirable if (i) the clinical picture and/or epidemiologic reality are not consistent with the presumptive serological diagnosis, and / or (ii) the disease is of such public health importance that even the occurrence of a single case needs to be confirmed using the most refined and carefully controlled laboratory methods. Such methods may only be available in a reference laboratory such as the DHEC state lab which works in close collaboration with CDC's own national reference laboratory network.

In the case you describe in your question, it was certainly appropriate to take steps necessary to confirm or disprove the diagnosis of measles. The context for this extra effort being is that transmission of domestic measles virus has been interrupted in the United States (7); the country is in measles elimination mode; and every single suspect case thus needs to be confirmed. In addition, measles, following the example of smallpox, and hopefully soon following the example of poliomyelitis (8) is already being proposed as the next target disease for global eradication (9).

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**For immediately reportable conditions, call your health district office or 1-888-847-0902. Routine reports may be phoned in to district or local health department or mailed on a completed DHEC DISEASE REPORTING CARD (DHEC 1129) . District Public Health Office numbers are listed on the Official List of Reportable Conditions. For a copy of the current Official List of Reportable Conditions, call 803-898-0861 or visit** www.scdhec.gov/hs/diseasecont/disease.htm.

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