



Reported Morbidity  
November, 1980

# MONTHLY MORBIDITY REPORT

Provisional Statistics

from

EPIDEMIOLOGY UNIT AND PUBLIC HEALTH STATISTICS

## NON-01 VIBRIO CHOLERAЕ

As has been pointed out in this publication previously,<sup>1</sup> cholera has played an important role in the history of medicine in Louisiana; along with yellow fever, its impact led to the formation of the State Board of Health in 1855. In 1978 there were eleven cases of cholera in Southwestern Louisiana caused by consumption of cooked crabs obtained from the state's marshes. This recent confrontation with *Vibrio cholerae* O-group 1 (biotype El Tor, serotype Inaba), the pathogenic organism of cholera, has revived great clinical and academic interest in seafood-related disease in general and diseases caused by *Vibrios* in particular.

The terminology of those *Vibrios* other than toxigenic *V. cholerae* 01 has been steeped in confusion. There are several *Vibrio* species which cause recognized clinical syndromes such as *V. parahaemolyticus*, *V. vulnificus* and *V. alginolyticus* (the so-called halophilic or marine *Vibrios*) as well as others of uncertain pathogenic significance including group F, *V. anguillarum*, and *V. metschnikovii*.<sup>2</sup> Additionally, there is a disease producing group of the *V. cholerae* species which is distinct from the well known toxin producing *V. cholerae* 01 (Classical and El Tor). This group of organisms, non-01 *Vibrio cholerae* (previously referred to as non-agglutinating *Vibrios* or non-cholera *Vibrios*) are biochemically identical to *Vibrio cholerae* 01; they differ by their failure to agglutinate in *Vibrio* O-group 1 antiserum. Non-01 *Vibrios* are serologically heterogeneous and can induce a serologic response in infected persons. Some strains have been found to elaborate an enterotoxin antigenically similar to that of *V. cholerae* 01 and, in fact, have recently been shown to possess the same toxin genes. There has been increasing awareness that non-01 organisms can cause human disease.

### Non-01 *V. Cholerae* in Louisiana

During the 1978 cholera outbreak an elaborate surveillance system of persons with diarrheal illness as well as environmental and sewage sampling with Moore Swabs was established throughout Southern Louisiana.

This system has allowed identification of non-01 as well as 01 *Vibrio cholerae* from both human and environmental sources. Since October of 1978 there have been 26 diarrheal illnesses in which non-01 *V. cholerae* was the only potential pathogen isolated from the index stool culture. Of these, fifteen cases occurred in the Greater New Orleans Area. Ages of the patients ranged from 6 to 72 years with a mean age of 42 years. Seventeen of the cases were males and 9 were females. Seventeen of the 25 (68%) cases for which data could be obtained were hospitalized. There were no deaths. The average duration of diarrhea was 8.5 days (range 1.5 to 21 days). All but two of the patients (92%) had eaten seafood prior to their illness. Of these 23 patients, 19 had eaten seafood within the week prior to development of symptoms (2 could not recall the time period) and 12 had done so during the previous 48 hours (91% and 57%, respectively). The type of seafood consumed, among those (19) who had eaten seafood within the week before their culture was obtained, was as follows: raw oysters - 11, boiled crabs - 3, crawfish - 1, shrimp - 1, combination - 3 (2 included raw oysters). Of those 13 persons who ate raw oysters, 11 could remember the number eaten; an average of 19 raw oysters was consumed per person (range 3 to 48). No control group has yet been interviewed for comparison and laboratory studies are still in progress.

### Clinical Features

The clinical features of gastroenteritis associated with the Louisiana non-01 *V. cholerae* infections are similar to those of previous studies.<sup>3</sup> Illness is generally characterized by watery diarrhea and abdominal cramps with frequent nausea and vomiting. Many patients have low grade fever. Diarrhea may become severe, leading to prostration, and in some cases can be bloody. Our patients appear to have suffered quite severe illnesses as 68% required hospitalization, compared with 46% in Hughes' study and only 11% in a Czechoslovakian outbreak.<sup>4</sup> Additionally, duration of diarrhea (8.5 days)

was longer for the Louisiana cases than has been noted in these studies (7 days and 1 - 2 days, respectively). There have been four previous outbreaks of non-O1 *Vibrio cholerae* gastroenteritis reported.<sup>4,5,6,7</sup> Since intensive casefinding identified most infected individuals, these outbreaks illustrate the spectrum of intestinal illness produced by non-O1 organisms more accurately than does the present accumulation of sporadic cases. Certainly there are milder sporadic cases that do not come to the clinician's attention; what we have described represents the more apparent illnesses at the severe end of the spectrum.

In contrast to toxigenic *V. cholerae* O1 which produces only gastroenteritis, non-O1 *V. cholerae* has been associated with extraintestinal diseases.<sup>2,3</sup> These organisms have been isolated from gallbladder, appendix, blood, wounds, sputum, ears and cerebrospinal fluid. Although the pathogenic role in many of these cases is unclear, they did appear to be the cause of infection in those patients with septicemias and wound infections. The presence of underlying disease seemed to predispose to septicemia.<sup>3</sup> This finding is in contrast with the occurrence of sporadic non-O1 *V. cholerae* diarrheal illness in otherwise healthy people. Wound infections caused by the non-O1 *V. cholerae* species have been correlated with exposure to sea water. Treatment of gastroenteritis caused by these organisms rests on oral and/or intravenous rehydration. Although antibiotics can decrease the severity and duration of cholera, their value in these infections has not been established. It has been suggested, however, that tetracycline is the drug of first choice if antibiotics are to be used.<sup>6</sup>

### Ecology and Epidemiology

Non-O1 *V. cholerae* strains are distributed widely in the environment; however, they are most frequently isolated from brackish surface waters. The organisms are found more often in the warmer months in water with a pH greater than 7.5 and a salinity of 0.4 to 1.7%.<sup>2</sup> They are not necessarily associated with sewage contamination, having been found in large numbers even when the coliform count has been very low. Although they have been isolated from seafood, the presence of non-O1 organisms in low numbers throughout the year in water without sewage contamination suggests that they can be free-living in the environment. Whether such strains are pathogenic for man is unknown. The finding of non-O1 *V. cholerae* predominantly in association with fecal coliforms in the Florida outbreak suggests that there may be a difference in the pathogenicity of the free-living organisms and those found in the presence of sewage contamination.<sup>6</sup> Humans may be the principal reservoir and the isolates from food and water associated with disease may have come from an infected patient. Chronic biliary-tract carriage has also been postulated.<sup>2</sup>

Studies of three outbreaks<sup>4,5,7</sup> showed that the vehicle of transmission was food in two (potatoes and

an egg and asparagus salad) and polluted well water in one. Sporadic cases of diarrheal illness caused by non-O1 *V. cholerae* have shown a strong association with recent foreign travel and the consumption of seafood.<sup>3</sup> In two case-control studies raw oysters were implicated as the vehicle of transmission for domestically acquired cases.<sup>6,9</sup> The incubation period in these cases is usually less than 48 hours. Epidemiologic features of the Louisiana cases support these findings. In the case of infections not localized to the gastrointestinal tract, occupational or recreational exposure to salt water has been associated with illness.<sup>3</sup> The relatively high mean age of patients with non-O1 *V. cholerae* infections has been ascribed to the epidemiology of the disease as children are perhaps less likely to eat raw oysters or travel overseas.<sup>9</sup> A consistent epidemiologic characteristic of patients with intestinal infection in the United States from whom non-O1 *V. cholerae* has been isolated from stools was residence in (or acquisition of disease in) a coastal state. Finally, in the reported epidemics, no secondary cases have been observed and no person-to-person transmission has been evident.

### Conclusion and Recommendations

Non-O1 *Vibrio cholerae* can cause gastrointestinal and, more rarely, systemic illness in United States residents. As a coastal state, Louisiana is a high risk location for this type of enteric infection. The spectrum of illness caused by these organisms is considerably broader than that associated with toxigenic *V. cholerae* O1. As with other *Vibrios*, seafood ingestion, particularly raw oyster consumption, appears to predispose to gastrointestinal infection in previously healthy individuals. Exposure to salt water seems to be associated with systemic illness in debilitated or immunosuppressed hosts. Non-O1 *V. cholerae* infection should be considered when these situations are encountered. The increasing recognition of this illness in Louisiana since 1978 has paralleled increasing use of thiosulfate-citrate bile salts sucrose (TCBS) agar as a selective medium for *Vibrio* isolation by routine diagnostic microbiology laboratories. In addition, our experience with cholera has increased our awareness of the pathogenicity of other *Vibrio* species. Most cases of gastroenteritis caused by these organisms are probably missed by bacteriology laboratories that use only routine enteric media for primary isolation of pathogens.<sup>2</sup> It is our recommendation that all such laboratories in Southern Louisiana routinely plate all rectal swabs and stool specimens submitted for culture directly onto TCBS agar. If colonies grow on this medium, the specimens can be forwarded to the Regional or State Health Department laboratories for more specific testing. Consultation on individual cases of *Vibrio* infection may be obtained from the Epidemiology Section of the Health Department and case reporting is strongly encouraged.

#### REFERENCE:

- 1 Epidemiology Unit and Public Health Statistics: Cholera. *Louisiana Monthly Morbidity Report*. pp 1-3. September, 1978.
- 2 Blake PA, Weaver RE, Hollis OG: Diseases of Humans (other than cholera) caused by *Vibrios*. *Ann. Rev Microbiol.* 34: 341-367. 1980.
- 3 Huges JM, Hollis OG, Gangarosa EJ, Weaver RE: Non-Cholera *Vibrio* Infections in the United States - clinical, epidemiologic, and laboratory features. *Ann. Intern. Med.* 88:602-606. 1978.
- 4 Aldova E, Lizickova K, Stepankova E, Lietava J: Isolation of non-agglutinable *Vibrios* from an enteritis outbreak in Czechoslovakia. *J. Infec. Dis.* 118:25-31. 1968.
- 5 Dabin DPH, Howell DJ, Sutton RGA, O'Keffe MF, Thomas P: Gastroenteritis due to non-agglutinable (non-cholera) *Vibrios*. *Med. J. Aust.* 2:487-490. 1974.
- 6 Wilson R, Lieb S, Roberts A, Stryker S, Janowski H, Gunn R, Davis B, Riddle C, Barrett T, Morris JG, Blake PA: Non-0 group 1 *Vibrio cholerae* gastroenteritis associated with eating raw oysters (in press)
- 7 World Health Organization: Outbreak of gastroenteritis by non-agglutinable (NAG) *Vibrios*. *WHO Weekly Epidemiol. Record.* 44:10. 1969.
- 8 Back E, Ljunggren A, Smith H Jr.: Non-cholera *Vibrios* in Sweden. *Lancet.* 1:723-724. 1974.
- 9 Morris JG, Wilson R, Davis BR, Wochsmuth IK, Riddle CF, Wathen HG, Pollard RA, Blake PA: Non-01 *Vibrio cholerae* gastroenteritis in the United States: clinical, epidemiologic, and laboratory characteristics of sporadic cases (in press).

## SELECTED REPORTABLE DISEASES (By Place of Residence)

STATE AND PARISH TOTALS REPORTED MORBIDITY NOVEMBER, 1980	VACCINE PREVENTABLE DISEASES					ASEPTIC MENINGITIS	HEPATITIS A AND UNSPECIFIED	HEPATITIS B	LEGIONNAIRES DISEASE	MALARIA**	MENINGOCOCCAL INFECTIONS	SHIGELLOSIS	TUBERCULOSIS, PULMONARY	TYPHOID FEVER	OTHER SALMONELLOSIS	UNDERNUTRITION SEVERE	GONORRHEA	SYPHILIS, PRIMARY AND SECONDARY	RABIES IN ANIMALS (PARISH TOTALS CUMULATIVE, 1980)
	MEASLES	RUBELLA*	MUMPS	PERTUSSIS	TETANUS														
TOTAL TO DATE 1979	260	32	31	18	3	101	717	250	4	6	120	113	485	5	176	9	21356	1039	33
TOTAL TO DATE 1980	13	13	68	34	5	76	817	275	5	47	88	212	447	2	183	7	20925	1259	16
TOTAL THIS MONTH	1	1	0	0	0	2	58	17	0	5	5	4	33	0	19	0	1304	86	2
ACADIA							1	2							2		4		
ALLEN																	1		
ASCENSION																	5		
ASSUMPTION																			
AVOYELLES																	4		1
BEAUREGARD																	1	2	
BIENVILLE																	7		2
BOSSIER																	15	1	
CADDO	1					1	1	1			1	3	2		4		111	1	4
CALCASIEU																	77	5	
CALDWELL																			
CAMERON																			
CATAHOULA													2				1		
CLAIBORNE																	3		
CONCORDIA							1										5		1
DESOTO																	3		
EAST BATON ROUGE							1	1							1		2		
EAST CARROLL																	111	7	
EAST FELICIANA																	3	1	
EVANGELINE							1										5		1
FRANKLIN																	2		
GRANT													1				7		
IBERIA							2	1									1		
IBERVILLE													1				13	1	
JACKSON																	3		1
JEFFERSON							7	1					3				84	8	
JEFFERSON DAVIS							1	1									10		
LAFAYETTE							4	2					2				17		
LAFOURCHE							1										3		
LASALLE																	1		
LINCOLN							1										16	2	
LIVINGSTON																	8		
MADISON							1										7		
MOREHOUSE							1										13		
NATCHITOCHE							1					1			1		2		2
ORLEANS						1	1	2		4	1	1	12		2		520	45	
OUACHITA							17						1				64	2	
PLAQUEMINES															1		2		
POINTE COUPEE																	2		
RAPIDES							1						1		2		47	1	
RED RIVER																	1		1
RICHLAND															2		3		
SABINE																	1	1	
ST. BERNARD							3						1				6		
ST. CHARLES																	3		
ST. HELENA																	5		
ST. JAMES																	3		
ST. JOHN																	12	2	
ST. LANDRY								3			1		1				5		
ST. MARTIN							1										4		
ST. MARY		1															1		
ST. TAMMANY							1	1									18	1	
TANGIPAHOA							8				1						19	2	
TENSAS																	7		
TERREBONNE																	3		
UNION							1	1		1	1						7		
VERMILION													1		1		1		
VERNON																	5	1	
WASHINGTON																	5	1	
WEBSTER								1					1				11	1	4
WEST BATON ROUGE																	3		
WEST CARROLL															1				
WEST FELICIANA																	1		
WINN																			
OUT OF STATE																	7		

\* Includes Rubella, Congenital Syndrome.

\*\* Acquired outside United States unless otherwise stated.

From January 1, 1980, through November 30, 1980, the following cases were also reported: 7 - Leptospirosis; 4 - Brucellosis; 1 - Blastomycosis; 1 - Cryptococcosis; 27 - Trichinosis; 1 - Poliomyelitis, non-paralytic; 3 - Rocky Mountain Spotted Fever; 12 - Encephalitis, Arthropod-Borne; 1 - Reyes Syndrome.