



April 28, 2005

**To:** State and Territorial Epidemiologists  
State and Territorial Public Health Laboratory Directors

**Subject:** Cholera and Other *Vibrio* Illness Surveillance System, Summary Data, 2003

Enclosed is a summary of data collected as part of *Vibrio* surveillance for 2003. The report will also be available at [http://www.cdc.gov/foodborneoutbreaks/vibrio\\_sum.htm](http://www.cdc.gov/foodborneoutbreaks/vibrio_sum.htm). Results are presented in two categories: *V. cholerae* isolates that produce cholera toxin, and all other *Vibrio* isolates. We appreciate your continued participation in this system. The rapid reporting of *Vibrio* infections, particularly those linked to seafood, facilitates timely tracebacks by state shellfish sanitation specialists.

If you have questions regarding this surveillance system or would like a copy of the most recent case report form (CDC 52.79 REV 07/00), please contact us. Forms are also available online at [www.cdc.gov/foodborneoutbreaks/reporting\\_outbreak.htm](http://www.cdc.gov/foodborneoutbreaks/reporting_outbreak.htm) under "Reporting Form for Cholera and Other *Vibrio* Illness".

Completed surveillance forms should be sent to:

Cholera and Other *Vibriosis* Surveillance System  
Foodborne and Diarrheal Diseases Branch, DBMD, NCID  
Centers for Disease Control and Prevention  
1600 Clifton Rd., Mailstop A-38  
Atlanta, GA 30333  
Tel: (404) 639-2206  
Fax: (404) 639-2205  
Email: [njm7@cdc.gov](mailto:njm7@cdc.gov)

Please continue to send all *V. cholerae* isolates to the Centers for Disease Control and Prevention (CDC) for serotyping and toxin production testing. Please also send *V. parahaemolyticus* isolates that you would like to have serotyped or confirmed. The address for isolates is:

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Atlanta, GA 30333  
Tel: (404) 639-3334  
Fax: (404) 639-3333  
Email: [cbopp@cdc.gov](mailto:cbopp@cdc.gov)

Thank you for your participation in the *Vibrio* Surveillance System. We look forward to working with you to control this important public health problem.

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### **Summary of human *Vibrio* isolates reported to CDC, 2003**

Infection with toxigenic *Vibrio cholerae* O1 and O139, the causative agents of cholera, has been a reportable disease in the United States for many years. In addition, since 1988, CDC has maintained a database of reported *Vibrio* infections from humans in order to obtain reliable information on illnesses associated with the range of *Vibrio spp.* This information has been used to educate consumers about the health risks of seafood, as well as to help determine host, food, and environmental risk factors.

This reporting system was initiated by the Food and Drug Administration (FDA), CDC and the Gulf Coast states (Alabama, Florida, Louisiana, Mississippi, and Texas) in 1998. Since 1997, many other states have also reported *Vibrio* isolates (Figure 1). However, only toxigenic *V. cholerae* O1 and O139 are nationally notifiable; thus the true number of *Vibrio* isolates is greater than reported. Participating health officials collect clinical data, information about underlying illness, history of seafood consumption and exposure to seawater in the seven days before illness, and conduct tracebacks of implicated oysters. CDC serotypes all *V. parahaemolyticus* isolates received from state health departments, and screens for cholera toxin production and the O1, O139 and O141 serogroups in *V. cholerae* isolates.

This report summarizes human *Vibrio* infections reported to CDC in 2003 using the “Reporting Form for Cholera and Other *Vibrio* Illnesses”. Results are presented in two categories: *V. cholerae* isolates that produce cholera toxin (referred to as toxigenic *Vibrio cholerae*), and all other *Vibrio* isolates, including those *V. cholerae* isolates that do not produce cholera toxin. Results are presented separately for Gulf Coast states versus other states to be consistent with previous reports. Additionally, results are presented by anatomic site of isolation. It is important to note that isolation of some *Vibrio spp.* from a patient with illness does not necessarily indicate causation. While many *Vibrio spp.* are well-recognized pathogens, the status of *V. damsela*, *V. furnissii*, *V. metschnikovii*, and *V. cincinnatiensis* as enteric pathogens is less clear.

#### **Isolates of toxigenic *Vibrio cholerae***

In 2003, toxigenic *V. cholerae* O1 was identified from two patients in two states (Table 1). One patient acquired the infection in the Philippines, while the other acquired the infection in Pakistan. One patient was hospitalized, and neither died. No isolates of toxigenic *V. cholerae* O139 were identified. However an isolate of toxigenic *V. cholerae* O141 was identified in a Georgia resident who consumed raw oysters the day before her symptoms began. The oysters could not be successfully traced back, but the Georgia Department of Agriculture confirmed that all the oysters from the supplying facility were from Florida.

#### **Other *Vibrio* isolates (excluding toxigenic *V. cholerae*)**

In 2003, 479 other *Vibrio* isolates from 462 patients were reported to the Cholera and Other *Vibrios* Surveillance System. Among patients for whom information was available, 189 (45%) of 417 were hospitalized and 41 (10%) of 401 died. *V. parahaemolyticus* was isolated from 158 (33%) patients, and was the most frequently reported *Vibrio* species. *V. vulnificus* was isolated from 113 (24%) patients; 93% were hospitalized and 31% died.

### *Geographic Location*

In 2003, we received 178 (39%) reports of *Vibrio* illness from Gulf Coast states, 112 (24%) from Pacific Coast states, 127 (27%) from Atlantic Coast states (excluding Florida), and 45 (10%) from inland states (Figure 1). The most frequent *Vibrio* species reported from Gulf Coast states were *V. vulnificus* (37%), *V. parahaemolyticus* (26%), non-toxicogenic *V. cholerae* (9%), and *V. fluvialis* (8%). The most frequent *Vibrio* species reported from non-Gulf Coast states were *V. parahaemolyticus* (40%), *V. vulnificus* (17%), non-toxicogenic *V. cholerae* (15%), and *V. alginolyticus* (14%).

### *Anatomic Site of Isolation*

Among the 479 *Vibrio* isolates from all states, 209 (44%) were from stool, 104 (22%) from blood, and 99 (21%) from wounds. In addition, 26 (5%) isolates were obtained from the ear, and 41 (9%) were from the gallbladder, urine, or other site. *V. parahaemolyticus* was the species most frequently isolated from stool (125 [60%] of 209 samples); *V. vulnificus* was the species most frequently isolated from blood (73 [70%] of 104 samples) and from wounds (41 [41%] of 99 samples).

### *Seasonality*

The number of patients from whom *Vibrio* species was isolated had a clear seasonal peak during the summer months (Figure 2). The greatest frequency occurred in August for Gulf Coast states and in July for non-Gulf Coast states.

### *Exposures*

One hundred and eight (23%) patients reported having a wound either before or during exposure to *Vibrios*. Of those, 93% reported water activities such as swimming and boating, 25% reported handling seafood, and 26% reported contact with marine wildlife. Excluding patients from whom *Vibrio* was isolated from a wound, and among the 381 for whom a food history was available, 275 (72%) reported eating seafood in the 7 days before illness onset. Among the 113 who reported eating a single seafood item (Table 4), 59% ate oysters (90% of whom consumed them raw), 11% ate shrimp, and 16% ate finfish. International travel in the 7 days before illness onset was reported by 40 (9%) of patients.

### *Laboratory*

For reports where laboratory confirmation was available, the state public health laboratory confirmed the identification of 190 (59%) of 321 *Vibrio* isolates. CDC received ninety-two isolates of *V. parahaemolyticus* from 85 patients. Of these, 87 were viable *V. parahaemolyticus* isolates, two were not *V. parahaemolyticus*, and one was not *Vibrio*. Of the viable *V. parahaemolyticus* isolates, 14 (16%) from nine states were serotype O3:K6 (Illinois, Connecticut, Maryland, Georgia, Rhode Island, Texas, Hawaii, Pennsylvania and New York), and 13 (15%) isolates from six states were O1:K56 (Colorado, Tennessee, Hawaii, New York, Nevada, Louisiana, Massachusetts); 11 (20%) from nine states were serotype O4:K12 (Illinois, Louisiana, Tennessee, New York, Connecticut, Maryland, Rhode Island, Georgia and Virginia), and the remaining 49 isolates were one of 18 serotypes.

**Table 1: Isolates of toxigenic *V. cholerae* 2003**

<b>State</b>	<b>Age</b>	<b>Sex</b>	<b>Onset</b>	<b>Suspected Exposure</b>	<b>Serogroup</b>	<b>Serotype</b>
AZ	37	F	6/02/2003	Exposure in Pakistan	<i>V. cholerae</i> O1	Ogawa
HI	12	M	12/27/2003	Exposure in Philippines	<i>V. cholerae</i> O1	Ogawa
GA	36	F	11/08/2003	Exposure in GA	<i>V. cholerae</i> O141	-

**Table 2. Number of *Vibrio* isolates (excluding toxigenic *V. cholerae*) by species, complications and site of isolation in patients from Gulf Coast states, 2003**

<i>Vibrio</i> Species	Patients		Complications <sup>1</sup>				Isolates		Site of Isolation			
			Hospitalized		Deaths				Stool	Blood	Wound	Other <sup>2</sup>
	N	(%)	n/N	(%)	n/N	(%)	N	(%)				
<i>V. alginolyticus</i>	13	(7)	8/13	(62)	1/12	(8)	14	(7)	0	1	10	3
<i>V. cholerae</i> -CT(-) <sup>3</sup>	16	(9)	9/15	(60)	0/16	(0)	17	(8)	4	7	0	5
<i>V. fluvialis</i>	15	(8)	10/15	(67)	1/14	(7)	15	(8)	8	2	0	5
<i>V. hollisae</i>	3	(2)	2/3	(67)	0/3	(0)	3	(1)	2	0	0	1
<i>V. mimicus</i>	6	(3)	3/6	(50)	0/5	(0)	6	(4)	3	1	2	0
<i>V. parahaemolyticus</i>	46	(26)	9/43	(21)	0/44	(0)	46	(25)	29	1	12	4
<i>V. vulnificus</i>	65	(37)	59/62	(95)	19/59	32	70	(36)	1	40	25	4
Other	1	(1)	1/1	(100)	0/1	0	1	(0)	1	0	0	0
Species not identified	12	(7)	3/11	(27)	1/10	10	12	(7)	3	1	1	7
Multiple species <sup>4</sup>	1	(1)	0/1	(0)	0/1	0	2	(1)	1	1	0	0
<b>Total</b>	<b>178</b>	<b>(100)</b>	<b>104/170</b>	<b>(61)</b>	<b>22/165</b>	<b>13</b>	<b>186</b>	<b>(100)</b>	<b>52</b>	<b>54</b>	<b>51</b>	<b>29</b>

<sup>1</sup> Denominators indicate patients for whom information is known.

<sup>2</sup> Includes ear, gall bladder, peritoneal fluid, sputum, urine, and unknown source.

<sup>3</sup> Non-toxigenic *V. cholerae*. Includes non-toxigenic *V. cholerae* O1 (2 isolates) and other non-toxigenic *V. cholerae* [non-O1 non-O139] (14 isolates).

<sup>4</sup> *V. parahaemolyticus* and other *Vibrio* species were isolated from the stool of one patient.

**Table 3. Number of *Vibrio* isolates (excluding toxigenic *V. cholerae*) by species, complications and site of isolation in patients from non-Gulf Coast states, 2003**

<i>Vibrio</i> Species	Patients		Complications <sup>1</sup>				Isolates		Site of Isolation			
			Hospitalized		Deaths				Stool	Blood	Wound	Other <sup>2</sup>
	n	(%)	n/N	(%)	n/N	(%)	n	(%)				
<i>V. alginolyticus</i>	39	(14)	4/30	(13)	0/30	(0)	39	(13)	2	1	16	20
<i>V. cholerae</i> -CT(−) <sup>3</sup>	41	(14)	15/38	(39)	4/39	(10)	42	(14)	25	9	4	4
<i>V. damsela</i>	1	(0)	0/1	(0)	0/1	(0)	1	(0)	0	0	1	0
<i>V. fluvialis</i>	18	(6)	6/14	(43)	0/13	(0)	19	(6)	12	2	3	2
<i>V. furnissi</i>	1	(0)	-	-	-	-	1	(0)	1	0	0	0
<i>V. hollisae</i>	4	(1)	1/4	(25)	0/4	(0)	4	(1)	4	0	0	0
<i>V. mimicus</i>	3	(1)	0/3	(0)	0/3	(0)	3	(1)	3	0	0	0
<i>V. parahaemolyticus</i>	112	(39)	16/99	(16)	1/93	(1)	112	(38)	96	2	7	7
<i>V. vulnificus</i>	48	(17)	37/41	(90)	11/39	(28)	53	(18)	2	33	16	2
Other	1	(0)	1/1	(100)	0/1	(0)	1	(0)	1	0	0	0
Species not identified	14	(5)	4/14	(29)	2/11	(18)	14	(5)	9	1	1	3
Multiple species <sup>4</sup>	2	(1)	1/2	(50)	1/2	(50)	4	(1)	2	2	0	0
<b>Total</b>	<b>284</b>	<b>(100)</b>	<b>85/247</b>	<b>(34)</b>	<b>19/236</b>	<b>(8)</b>	<b>293</b>	<b>(100)</b>	<b>157</b>	<b>50</b>	<b>48</b>	<b>38</b>

<sup>1</sup> Denominators indicate patients for whom information is known.

<sup>2</sup> Includes cyst, appendix, ear, peritoneal fluid, sputum, urine, sinus and unknown source.

<sup>3</sup> Non-toxigenic *V. cholerae*. Includes non-toxigenic *V. cholerae* O1 (3 isolates), *V. cholerae* O139 (2 isolates) and other non-toxigenic *V. cholerae* non-O1 non-O139 (37 isolates).

<sup>4</sup> *V. fluvialis*, and *V. furnissi* were isolated from the wound of one patient; *V. cholerae* non-O1 non-O139 and *V. vulnificus* were isolated from the wound of another patient.

**Table 4. Seafood exposure among patients with foodborne *Vibrio* infection who reported eating a single seafood item in the seven days before illness onset, 2003**

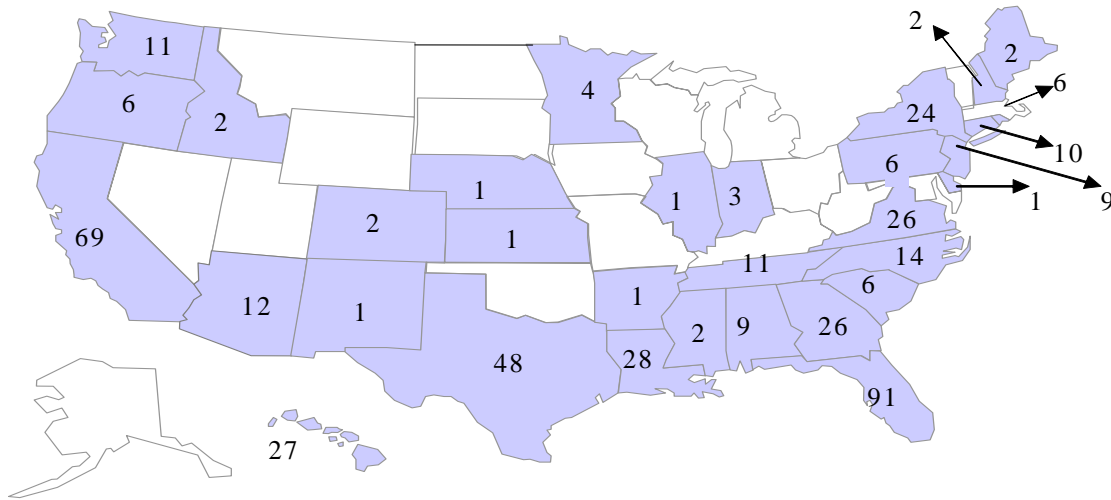
	Mollusks			Crustaceans				Other Shellfish <sup>1</sup>	Finfish <sup>2</sup>	Total
	Oysters	Clams	Mussels	Shrimp	Lobster	Crab	Crayfish			
<b>Ate (%)</b>	67(59)	5(4)	0(0)	11(10)	0(0)	6(5)	3(3)	3(3)	18(16)	113
<b>% Ate raw</b>	90	100	-	13	-	20	0	50	23	60

<sup>1</sup> Other shellfish reported: conch, squid, “tako”

<sup>2</sup> Finfish reported: ceviche squid, cod, flounder, herring, salmon, sea bass, swordfish, tilapia, tuna



**Figure 1. Number of patients with *Vibrio* isolates (excluding toxigenic *V. cholerae*) of *Vibrio* illness by state, 2003 (N=462 patients)**



**Figure 2. Number of patients with *Vibrio* isolates (excluding toxigenic *V. cholerae*), by month\*, Gulf Coast states vs. other states, 2003 (N=436)**

\*Onset date missing or unknown for 26 patients

