VIRGINIA
EPIDEMIOLOGY BULLETIN

Robert B. Stroube, M.D., M.P.H., Health Commissioner and State Epidemiologist

Elizabeth Barrett, D.M.D., M.S.P.H., Editor
Vickie L. O'Dell, Layout Editor

July 2002 Volume 102, No. 7

Vibrio Infections, Virginia, 1992-2002

Eleven cases of *Vibrio* infection, including two deaths, have been reported in Virginia residents so far this year. These are laboratory-confirmed cases for which reports were submitted by physicians, private laboratories, and the state laboratory (the Division of Consolidated Laboratory Services). Over the past 10 years (1992-2001), an average of 12 cases has been identified annually (Figure 1), with a marked increase seen last year. The purpose of this article is to discuss *Vibrio* illnesses, summarize the Virginia cases, and provide information for preventing illness.

Persons at high risk for complications of *Vibrio* infection should be warned of the danger of eating raw or undercooked shellfish.

Background

Vibrio are halophilic bacteria that are normal inhabitants of estuarine waters and are not considered pollutants. The most well known species, *Vibrio cholerae* O1, is rarely identified in this country. In the U.S., the most commonly identified *Vibrio* species are *parahaemolyticus*, *vulnificus*, and *cholerae* non-O1/non-O139. However, a number of other more rarely identified species also cause human disease.

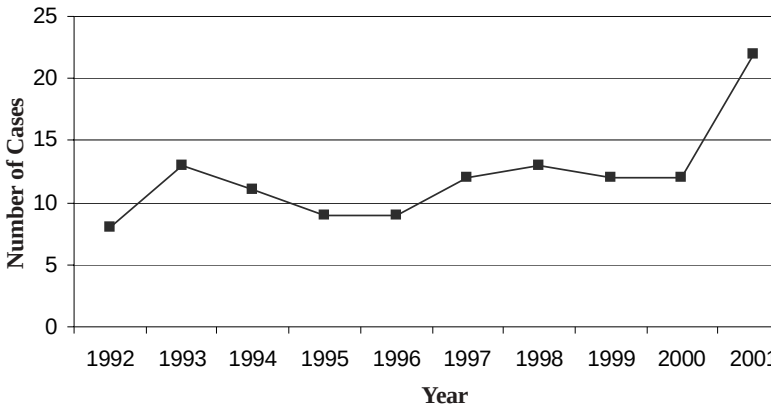
V. parahaemolyticus and *V. cholerae* non-O1/non-O139 typically cause gastroenteritis that is generally preceded by ingestion of raw or undercooked shellfish, mainly raw oysters. Symptoms include profuse watery diarrhea, abdominal cramps which can be severe, headache, and sometimes fever and vomiting. While diarrhea may persist for several days, the illness is generally self-limiting and without residual effects. Gastroenteritis due to these organisms can occur in anyone who eats raw or undercooked shellfish, including young, healthy adults. For example, 11 cases of gastroenteritis caused by *V. parahaemolyticus* were reported last year; only four of these persons were known to have underlying medical conditions. In addition to gastroenteritis, wound infections may occur in persons who cut themselves while in saltwater or have a fresh wound that is exposed to saltwater. Systemic infection and death rarely occur.

V. vulnificus is the organism most frequently associated with severe disease. People with the following health conditions are at highest risk: liver disease, alcoholism, diabetes, HIV infection or AIDS, gastric disorders, hemochromatosis or hemosiderosis, or any illness or treatment which results in a compromised immune system.

V. vulnificus infection manifests itself in two main ways:

- *Primary septicemia with or without secondary cutaneous manifestations*. A person with one or more of the above risk factors develops septicemia usually within three days of eating raw or improperly cooked shellfish. With primary septicemia, mortality approaches 50% and is due to uncontrolled sepsis.
- *Wound infections*. A person with or without underlying risk factors acquires a wound or exposes a preexisting wound to shellfish or saltwater. The result is a wound infection which may develop into secondary septicemia. Severe infec-

Figure 1. *Vibrio* Infections Reported in Virginia, 1992-2001*



**Includes two cases of cholera, both in travelers to foreign countries.*

In This Issue

tions tend to develop in those with the above named risk factors.

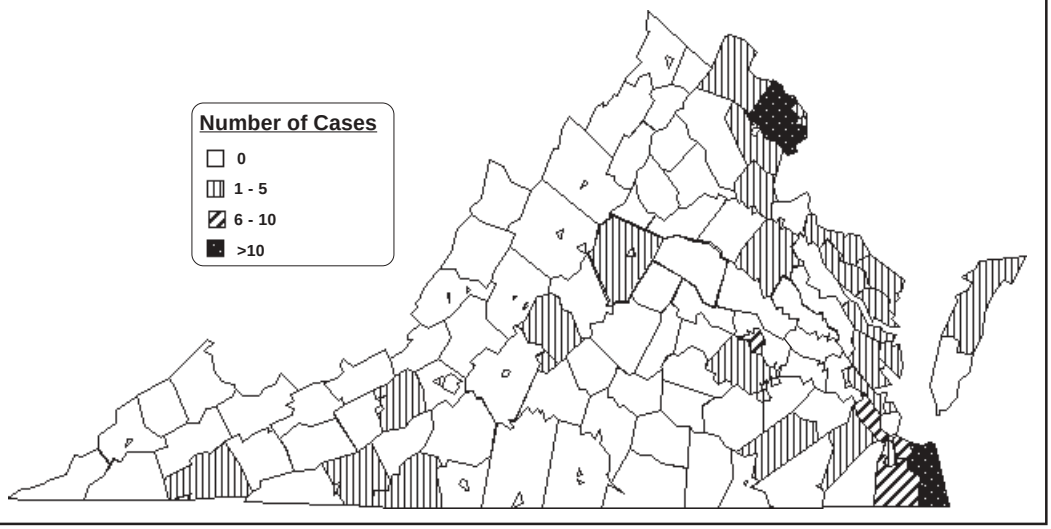
Virginia Cases

Using surveillance data collected by the Office of Epidemiology, we summarized the reported *Vibrio* cases for the past 10 complete calendar years (1992-2001) and then took a closer look at cases reported in 2001 and 2002. From 1992-2001, a total of 121 cases were reported, ranging from 8-22 per year (Figure 1). Over 75% of persons reported with *Vibrio* infection resided in the northern and eastern regions of the state. (Figure 2) The most commonly reported species were *V. parahaemolyticus* and *V. vulnificus* (Figure 3). Two cases of cholera occurred in the early 1990s, both in persons with a history of foreign travel to endemic areas. Persons reported with *Vibrio* illnesses ranged in age from 5-98 years (median=44 years); 83 (69%) cases occurred in males. A total of four deaths occurred, all in males aged 55-66 years. All of the deaths were due to infection with *V. vulnificus* for a case fatality rate of 14% for that species.

More detailed information on clinical illness, risk factors, and source of infection has been collected for cases reported in calendar years 2001 (22 cases) and 2002 (11 cases to date). During this time, 17 cases of *V. parahaemolyticus* were reported. Only one of the 14 cases with gastroenteritis was hospitalized. Two of the three patients with wound infections due to *V. parahaemolyticus* were hospitalized (6 days each). One person had a preexisting surgical wound which reopened and was exposed to saltwater, while the other two sustained wounds while in the water which subsequently became infected. No long term sequelae were reported.

During 2001-2002, six cases of *V. vulnificus* were reported. Four of these persons developed septicemia, one of whom died. Of these, one had primary septicemia; this person, who had a history of liver disease, had ingested numerous steamed clams and five days later developed chills, fever to 103°F, and rapidly expanding bullae and cellulitis of the leg. He was hospitalized for over 2 weeks. A case of secondary septicemia developed in a 62 year old diabetic who scratched his toe on a rock while fishing in brackish waters. The exposure history for the other two persons with septicemia is unknown.

Figure 2. *Vibrio* Cases by Locality, Virginia, 1992-2001



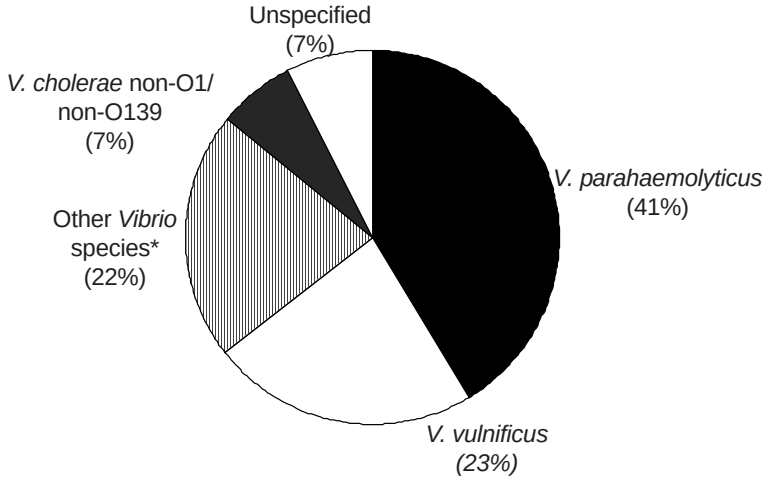
Another elderly, diabetic patient developed *V. vulnificus* infection in his foot. Although he did not become septic, the severe localized infection resulted in amputation of the foot. Table 1 summarizes the illnesses and complications associated with *Vibrio* infection in cases reported in 2001 and 2002.

Disease Reporting and Follow-Up

Prompt reporting of all *Vibrio* cases is essential for timely follow-up and for implementing appropriate control measures. What happens when a case of *Vibrio* is reported? Upon receiving (preferably by telephone) a report from a physician or receipt of a laboratory report, the local health department begins its investigation. The primary goal of the investigation is to determine the source of the patient's infection and therefore, an extensive patient interview is conducted. If a shellfish exposure is identified, an environmental health specialist visits the implicated restaurant or vendor to obtain information on storage, preparation, and source of the product. Restaurants are required to keep special tags which accompany oysters that are still in their shells. These tags identify the distributor and harvest site and date. This information is reported to the Virginia Department of Health's Division of Shellfish Sanitation (DSS) which has responsibility for insuring the safety of Virginia shellfish.

DSS conducts a traceback of the oyster to the harvest site. If a Virginia harvest site is implicated in an outbreak of *V. parahaemolyticus*, the site will be inspected and closed; shellfish may be recalled from the market. Two or more cases of *V.*

Figure 3. *Vibrio* Species Reported in Virginia, 1992-2001



*Includes *V. fluvialis* (7), *V. hollisae* (7), *V. mimicus* (7), *V. cholerae* 01 (2), *V. alginolyticus* (2), and *V. damsela* (1).

Table 1. *Vibrio* infections reported in Virginia, 2001-2002, by illness and complications (n=33)

Vibrio Species	Total #	Illness				Complications	
		Gastroenteritis	Septicemia	Wound Infection	Other	Hospitalized	Deaths
V. parahaemolyticus	17	14	0	3	0	3	0
V. vulnificus	6	0	4	1	1*	4	1
V. cholerae non-O1/ non-O139	3	1	2	0	0	2	1
V. fluvialis	2	2	0	0	0	0	0
V. damsela	1	0	0	1	0	Unk.	Unk.
V. alginolyticus	1	0	0	1	0	Unk.	0
Species not identified	3	0	0	2	1**	Unk.	Unk.

*Isolated from placenta of spontaneously aborted fetus.
**Ear drainage.

vulnificus trigger an extensive education campaign for at-risk persons. Safe handling of shellfish and appropriate storage temperatures are reviewed with the wholesale processors. Shellfish traced to another state's waters is promptly reported to that state. Thus, timely reporting of *Vibrio* disease triggers an intensive public health response that helps to insure that shellfish in Virginia are safe for consumption.

To date, Virginia oysters have not been implicated in a *Vibrio*-related outbreak and no cases of *V. vulnificus* have ever been traced to Virginia waters. However, this could be due to the relatively small number of oysters harvested from Virginia waters compared to other areas. *Vibrio* organisms occur naturally in all subtropical and temperate estuarine waters. All *V. vulnificus* cases due to oyster consumption have been traced to Gulf state waters; however *V. parahaemolyticus* cases occur sporadically nationwide.

Prevention

Prevention of *Vibrio* infection should be directed at individuals at high risk for severe complications. The primary focus is to educate these persons about the risks of eating raw or undercooked shellfish. In addition, immunocompromised persons are at risk for developing very severe wound infections should they expose preexisting wounds to saltwater or sustain an injury while in the water.

The Office of Epidemiology has just developed a patient brochure entitled, *The Risk of Eating Raw Oysters or Clams*. Copies are available from your local health department or may be downloaded from www.vdh.state.va.us/epi/oystersvibrio.pdf.

Pfiesteria Update

During the warm weather months, the microorganism *Pfiesteria* has been associated with fish kill events along the eastern seaboard, possibly with human health effects. After visiting Virginia, North Carolina, or Maryland coasts during the warm season, your patients may report symptoms consistent with Estuary Associated Syndrome (EAS) if they were exposed to affected waters during a *Pfiesteria*-related fish kill. For the purposes of surveillance and for exclusion of other illnesses, a case definition has been developed by the Centers for Disease Control and Prevention. CDC's definition for EAS has three criteria that must be met:

1. Symptoms develop within 2 weeks after exposure to estuarine water;
2. Memory loss or confusion of any duration and/or 3 or more of these symptoms: headache, skin rash at the site of water contact, sensation of burning skin, eye irritation, upper respiratory irritation, muscle cramps and gastrointestinal symptoms; and with the exception of skin rash at the site of water contact and sensation of burning skin, these symptoms must persist for 2 or more weeks for a person to meet the symptom criteria; and
3. A health care provider cannot identify another cause for the symptoms.

If you or your patients have questions or want to report EAS symptoms, please call the Virginia Department of Health, Division of Waterborne Hazards Control *Pfiesteria* Hotline (1-888-238-6154). For more information about *Pfiesteria* visit the Division's website (http://www.vdh.state.va.us/whc).

Cases of Selected Notifiable Diseases Reported in Virginia*

Disease	Total Cases Reported, June 2002: State	Regions: NW	N	SW	C	E	Total Cases Reported Statewide, January through June: This Year	Last Year	5 Yr Avg
AIDS	91	12	54	3	11	11	420	472	454
Campylobacteriosis	71	15	4	15	15	22	223	226	236
***E. coli* O157:H7**	12	1	1	6	2	2	21	20	22
Giardiasis	26	9	4	5	3	5	101	179	176
Gonorrhea	802	41	47	83	227	404	5,154	4,594	4,240
Hepatitis A	11	1	0	2	6	2	47	67	88
B, acute	17	1	0	5	4	7	105	76	63
C/NANB, acute	1	0	0	0	1	0	2	0	5
HIV Infection	106	4	32	7	34	29	472	473	420
Lead in Children†	39	5	7	6	14	7	285	280	243
Legionellosis	4	0	1	2	1	0	8	7	9
Lyme Disease	14	7	0	1	1	5	22	53	26
Measles	0	0	0	0	0	0	0	0	1
Meningococcal Infection	9	1	1	2	1	4	26	25	28
Mumps	0	0	0	0	0	0	3	2	5
Pertussis	19	13	0	2	3	1	88	12	15
Rabies in Animals	46	12	8	8	8	10	286	218	283
Rocky Mountain Spotted Fever	6	3	0	2	1	0	7	3	2
Rubella	0	0	0	0	0	0	0	0	0
Salmonellosis	103	16	23	24	18	22	370	496	417
Shigellosis	96	5	6	6	21	58	457	93	122
Syphilis, Early§	25	0	7	2	1	15	81	141	216
Tuberculosis	17	2	7	2	5	2	122	121	144

Localities Reporting Animal Rabies This Month: Arlington 1 raccoon; Augusta 1 cat, 1 fox, 1 raccoon; Bedford 2 raccoons; Chesapeake 1 raccoon; Dinwiddie 1 raccoon; Fairfax 1 groundhog, 3 raccoons; Fauquier 1 raccoon; Gloucester 1 fox; Greene 1 cat, 1 raccoon; Halifax 1 skunk; Hampton 1 raccoon; Hanover 1 raccoon; Henrico 3 raccoons; Loudoun 1 fox; Mecklenburg 1 skunk; Norfolk 1 raccoon; Northampton 2 raccoons; Nottoway 1 raccoon; Pittsylvania 1 bovine, 1 raccoon, 1 skunk; Portsmouth 1 raccoon; Prince William 1 raccoon, 1 skunk; Shenandoah 1 raccoon; Spotsylvania 3 skunks; Stafford 1 raccoon; Tazewell 2 raccoons; Warren 1 raccoon; Westmoreland 1 fox, 2 raccoons; Wythe 1 raccoon.

Toxic Substance-related Illnesses: Asbestosis 30; Lead Exposure 3; Pneumoconiosis 6.

*Data for 2001 are provisional. †Elevated blood lead levels ≥10µg/dL.

§Includes primary, secondary, and early latent.

Published monthly by the
VIRGINIA DEPARTMENT OF HEALTH
Office of Epidemiology
P.O. Box 2448
Richmond, Virginia 23218
http://www.vdh.state.va.us
Telephone: (804) 786-6261

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment

PRESORTED STANDARD U.S. POSTAGE PAID Richmond, Va. Permit No. 591