

Introduction to Communicable Disease Surveillance and Investigation in North Carolina



Vibriosis Surveillance in North Carolina

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Vibrio Learning Objectives

- Know the different species of Vibrio and the correct means of reporting
- Identify reservoir and means of transmission for main species
- Explain why surveillance is conducted
- Describe control measures appropriate for species



Know Your Vibrios...

Cholera (6) in NC EDSS

- Rare in NC, all cases associated with travel
- Only two serogroups, **O1** and **O139** cause classic disease “cholera”
- Often cultures positive for *V. cholerae* are reported
- All *V. cholerae* isolates should be sent to SLPH for serogroup determination
- If serogroup is other than O1/O139, report as Vibrio other



Know Your Vibrios...

V. vulnificus (54) in NC EDSS

- Generally acquired following estuarine environment contact; **wound contamination**
- 25% case fatality rate in N.C.



Know Your Vibrios...

Vibrio other than *vulnificus* or *V. cholerae* serogroup O1/O139 (55) in NC EDSS

- *V. parahaemolyticus*
 - Inadequately cooked seafood
- *V. alginolyticus*
 - Common cause of ear infections following marine water contact
- *V. fluvialis*
- *V. spp*

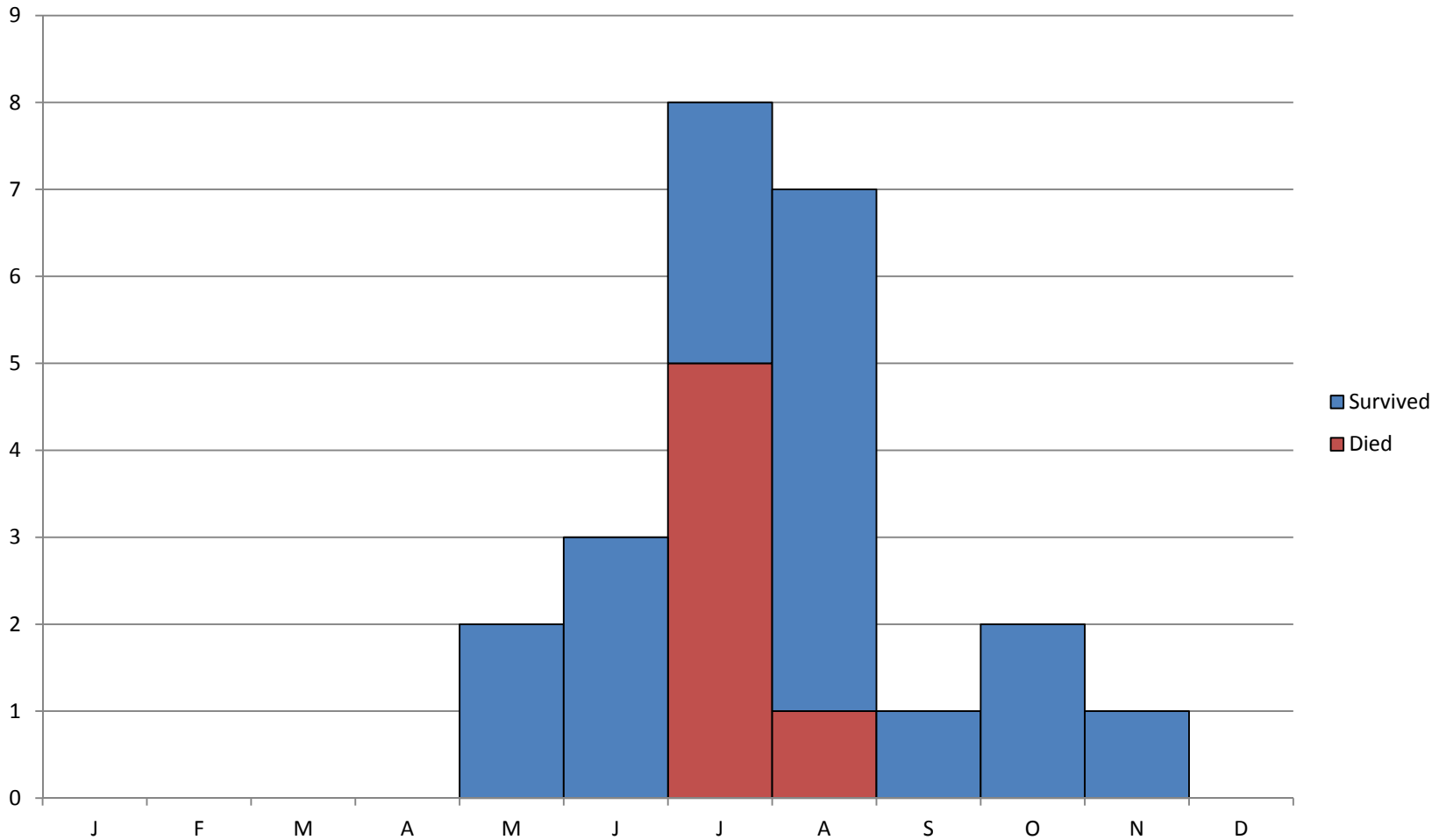


Focus of this Presentation

- Illness due to *Vibrio spp* other than *V. cholerae* O1/O139
- Cholera is not endemic to NC or the US and cases are always associated with travel
- Questions about *V. cholerae* O1/O139 should be referred directly to the Medical Consultation Unit (MCU) at 919-733-3419



Confirmed *V. vulnificus* cases by symptom onset month, NC, 08-12 (n=24)





V. vulnificus



Characterized and named in 1979

Free living halophilic bacterium found in warm marine environments

Concentrated in filter feeding organisms such as oysters, clams, etc.

Transmission occurs via

Consumption of undercooked contaminated seafood, or

Exposure of wounds to contaminated waters

Infectious dose unknown

High case fatality rate: 25% in NC

V. vulnificus Clinical Illness

Daniels. CID. 2011;52(6)788-792



Three Distinct Syndromes

Wound infection (45% of cases)

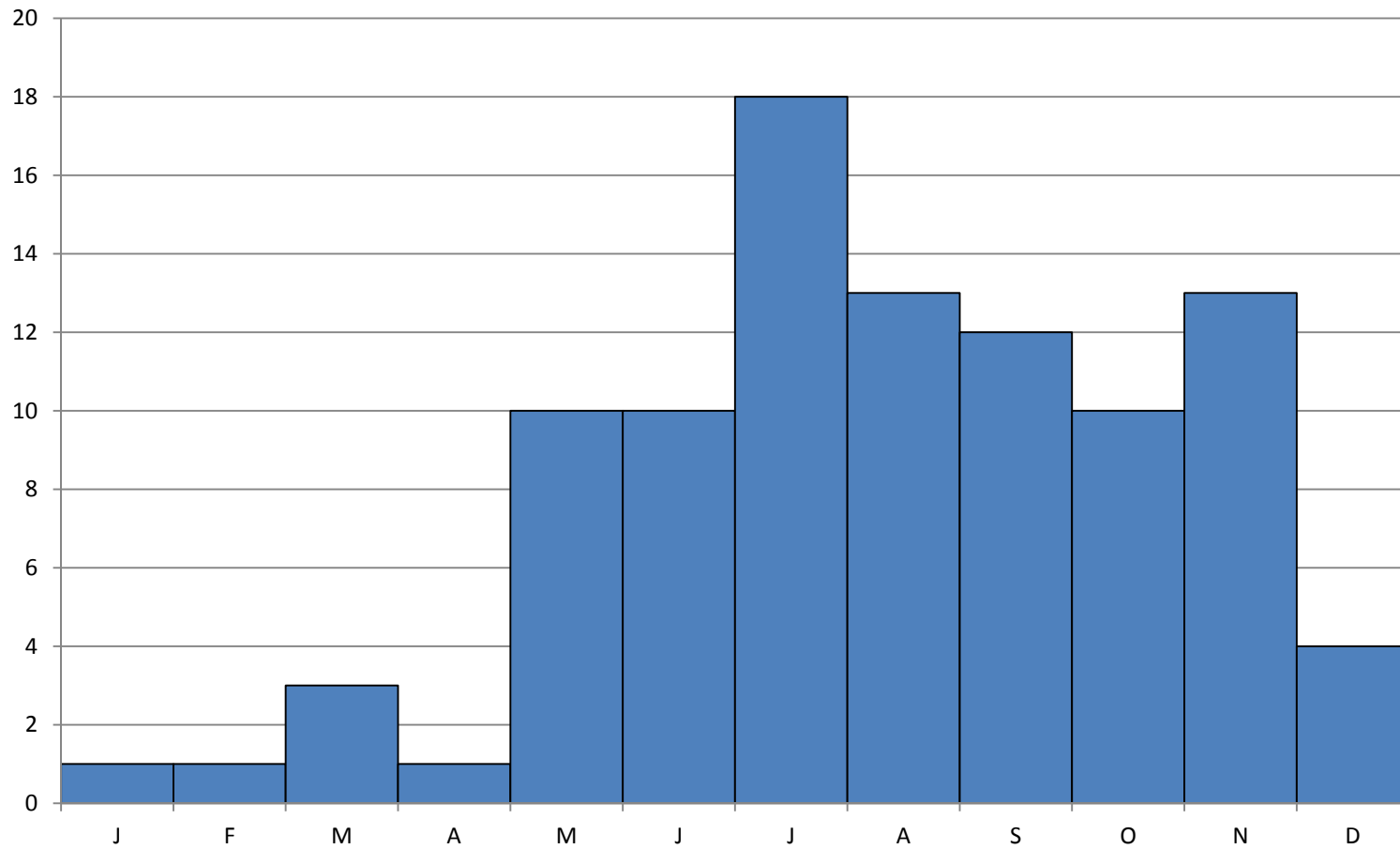
- Often necrotizing, occur following wound exposure to contaminated seawater

Septicemia (43% of cases)

- 96% of these cases reported consumption of raw or undercooked oysters in 7 days preceding illness onset
- **Nearly all cases have chronic underlying liver disease**
- Organism crosses intestinal mucosa rapidly causing systemic illness
- Bullous skin lesions an early manifestation of sepsis

GI tract limited infections (5% of cases)

Confirmed *Vibrio spp.* (other than vulnificus & cholerae O1/O139) infection by month symptom onset, NC, 08-12 (n=96)



V. parahaemolyticus

Characterized in 1950

Free living halophilic bacterium found in warm marine environments

Concentrated in filter feeding organisms such as oysters, clams, etc.

Transmission occurs via

Consumption of undercooked contaminated seafood, or

Exposure of wounds to contaminated waters
(much less common than *V. vulnificus*)

No fatalities reported in N.C. though they can occur.

V. parahaemolyticus

Clinical Illness

Three Distinct Syndromes

GI tract limited infections 88% of these cases reported consumption of raw or undercooked oysters in 7 days preceding illness onset

Wound infection (34% of cases)

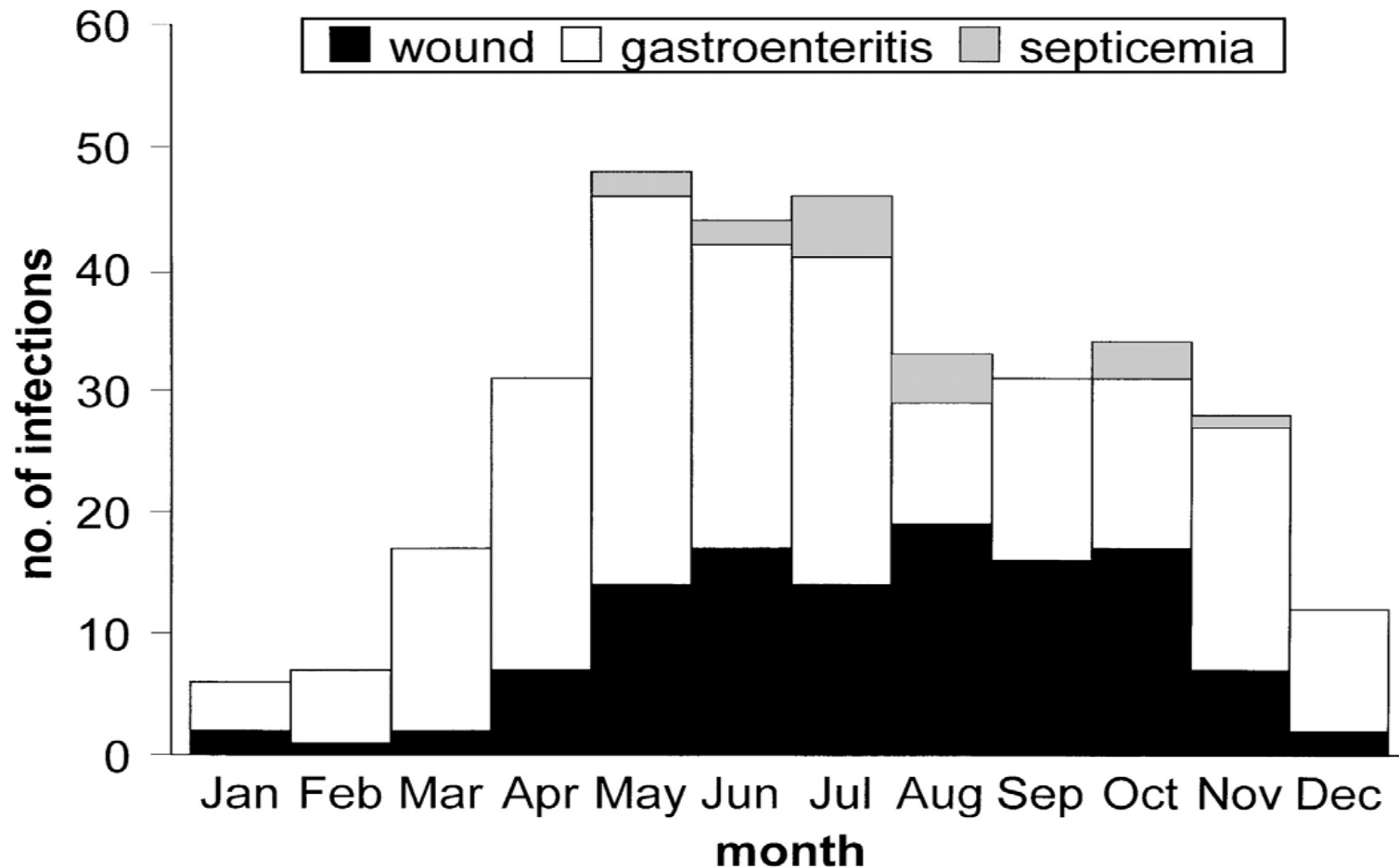
Occur following wound exposure to contaminated seawater, may cause necrotizing fasciitis

Septicemia (5% of cases)

Cases were more likely than GI cases to have a history of alcoholism or liver disease

Commonly associated with foodborne illness outbreaks attributable to seafood

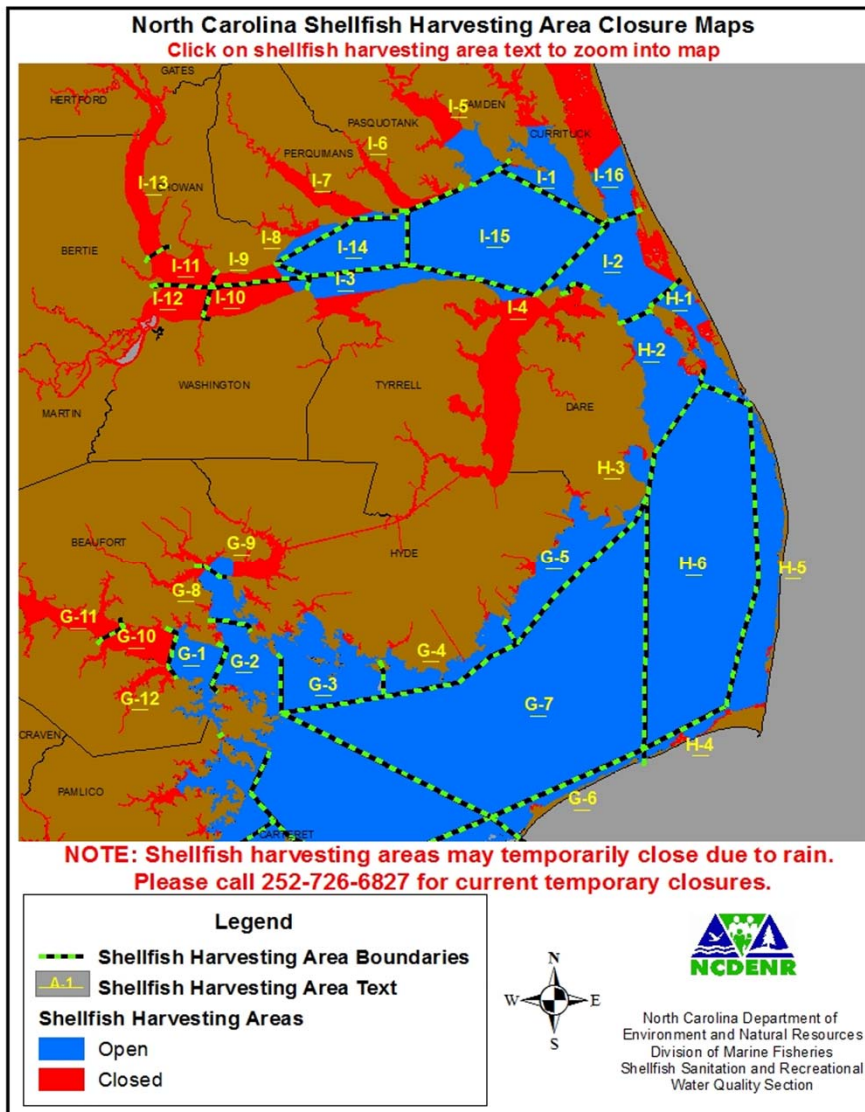
Vibrio parahaemolyticus infections in the United States, as reported to the Centers for Disease Control and Prevention, by month of culture date, 1988–1997.



Daniels N A et al. *J Infect Dis.* 2000;181:1661-1666

Comparing Vv and Vp

	<i>V. vulnificus</i>	<i>V. parahaemolyticus</i>
Source	Estuarine waters or consumption of raw or under cooked shellfish	
Incubation	12-72 hours	12-24 hours
Symptoms GI	+	+++
Symptoms Wound	+++	++
Symptoms Septicemia	+++ (especially noted in those with chronic underlying liver disease; development of bullous skin lesions)	+
Fatal	Common, 25% CFR in NC	Rarely, not reported in NC
Outbreak potential	Limited	Historically common



V. alginolyticus

Reilly. *Vibrio alginolyticus*-associated wound infection acquired in British waters, Guernsey, July 2011. *Euro Surveill.* 2011;16(42)

Free living halophilic bacterium found in warm marine environments

Generally causes superficial wound or ear infections resulting from exposure of cuts or abrasions to contaminated seawater

No fatalities reported



Why Conduct Surveillance?

Surveillance is needed to better define

- the burden of disease,
- identify and control outbreaks,
- provide information on the temporal, geographic, and demographic features of vibriosis,
- define and evaluate prevention strategies

CSTE position statement 11 – ID – 12



Case Definition

- **Clinical Description**

An infection of variable severity characterized by watery diarrhea, primary septicemia, or wound infection.

Asymptomatic infections may occur, and the organism may cause extra-intestinal infection.

- **Laboratory Criteria for Diagnosis**

Isolation of a species of the family *Vibrionaceae* (other than toxigenic *Vibrio cholerae* O1 or O139, which are reportable as cholera) from a clinical specimen.

- **Case Classification**

Probable: A clinically compatible case that is epi linked to a confirmed case.

Confirmed: A case that meets the laboratory criteria for diagnosis.



CDC COVIS

Cholera and Other *Vibrio* Illness Surveillance

- National surveillance system for human infection with pathogenic species of the family Vibrionaceae, which cause vibriosis and cholera
- Information from COVIS helps track *Vibrio* infections and determine host, food, and environmental risk factors for these infections



PATIENT'S NAME:	TEL.: Home	Work
ADDRESS:		
PHYSICIAN'S NAME:	TEL.:	

– PATIENT IDENTIFIERS NOT TRANSMITTED TO CDC

Reset Form



**CHOLERA AND OTHER VIBRIO ILLNESS
SURVEILLANCE REPORT**

OMB 0920- 0004 Exp. Date 06/30/2013

SEND COMPLETED REPORT TO STATE INFECTION CONTROL

State will forward to: Centers for Disease Control and Prevention
Enteric Diseases Epidemiology Branch
1600 Clifton Road, MS C09
Atlanta, GA 30333 | Fax 404-639-2205

I. DEMOGRAPHIC AND ISOLATE INFORMATION
REPORTING HEALTH DEPARTMENT

CDC will accept extracts from NCEDSS so long as all required information from the COVIS form is present

[http://www.cdc.gov/nationalsurveillance/
PDFs/cdc5279-covis-vibriosis-508c.pdf](http://www.cdc.gov/nationalsurveillance/PDFs/cdc5279-covis-vibriosis-508c.pdf)

Epi Information

Travel and Food History

III. EPIDEMIOLOGIC INFORMATION

1. Did this case occur as part of an outbreak? (Two or more cases of *Vibrio* infection) Yes No Unk. **Reset #1**
 (1) (2) (9) If YES, describe: _____

2. Did the patient travel outside his/her home state in the 7 days before illness began? **Patient home state:** **Reset #2**

Yes (1)	No (2)	Unk. (9)	City/State/Country	Date Entered			Date Left		
				Mo.	Day	Yr.	Mo.	Day	Yr.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			2. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			3. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If YES, list destination(s) and dates:

3. Please specify which of the following seafoods were eaten by the patient in the 7 days before illness began: (If multiple times, most recent meal) **Reset #3**

Type of seafood	Yes (1)	No (2)	Unk. (9)	Mo.	Day	Yr.	Any eaten raw?			Type of seafood	Yes (1)	No (2)	Unk. (9)	Mo.	Day	Yr.	Any eaten raw?		
							Yes (1)	No (2)	Unk. (9)								Yes (1)	No (2)	Unk. (9)
Clams.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Shrimp....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crab.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Crawfish...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lobster....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other shellfish ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mussels...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(specify): _____									
Oysters...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fish.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
										(specify): _____									

Epi Information

Water Exposure

4. In the 7 days before illness began, was patient's skin exposed to any of the following?

Reset #4

Yes No Unk.

(1) (2) (9)

A body of water (fresh, salt, or brackish water).....

Drippings from raw or live seafood.....

Other contact with marine or freshwater life.....

Date of exposure: Mo. Day Yr.

Time of exposure: Hour Min. am (1) pm (2)

If YES, specify body of water location: _____

If YES, to any of the above, answer each:

Yes No Unk.

(1) (2) (9)

Handling/cleaning seafood.....

Swimming/diving/wading.....

Walking on beach/shore/fell on rocks/shells.....

Boating/skiing/surfing.....

Construction/repairs.....

Yes No Unk.

(1) (2) (9)

Bitten/stung.....

Other: (specify).....

• If skin was exposed to water, indicate type:

Salt (1) Brackish (3) Unk. (9)
 Fresh (2) Other(specify): (8)

Additional comments:

• If skin was exposed, did the patient sustain a wound during this exposure, or have a pre-existing wound? (choose one):

YES, sustained a wound. (1) YES, had a pre-existing wound. (2) YES, uncertain if wound new or old. (3) NO (4) Unk. (9)

If YES, describe how wound occurred and site on body :

(Note: Skin bullae that appear as part of the acute illness should be recorded in section II, Clinical Information, only).

Detailed Seafood Investigation

1. Type of seafood (e.g., clams): _____		Date consumed: Mo. <input type="text"/> <input type="text"/> Day <input type="text"/> <input type="text"/> Yr. <input type="text"/> <input type="text"/>	Time consumed: Hour <input type="text"/> <input type="text"/> Min. <input type="text"/> <input type="text"/>	<input type="checkbox"/> am (1) <input type="checkbox"/> pm (2)	Amount consumed: <input style="width: 100px;" type="text"/>
<input type="button" value="Reset #1"/>					
If patient ate multiple seafoods in the 7 days before onset of illness, please note why this seafood was investigated (e.g., consumed raw, implicated in outbreak investigation): _____					
2. How was this fish or seafood prepared? <input type="button" value="Reset #2"/>					
<input type="checkbox"/> Raw (1) <input type="checkbox"/> Baked (2) <input type="checkbox"/> Boiled (3) <input type="checkbox"/> Broiled (4) <input type="checkbox"/> Fried (5) <input type="checkbox"/> Steamed (6) <input type="checkbox"/> Unk. (9) <input type="checkbox"/> Other (8) (specify): _____					
3. Was seafood imported from another country? <input type="button" value="Reset #3"/>					
Yes (1) <input type="checkbox"/> No (2) <input type="checkbox"/> Unk. (9) <input type="checkbox"/> If YES, specify exporting country if known: _____					
4. Was this fish or shellfish harvested by the patient or a friend of the patient? <input type="button" value="Reset #4"/>					
Yes (1) <input type="checkbox"/> No (2) <input type="checkbox"/> Unk. (9) <input type="checkbox"/> (If YES, go to question 12.)					
5. Where was this seafood obtained? (Check one)			6. Name of restaurant, oyster bar, or food store: Tel: _____		
<input type="checkbox"/> Oyster bar or restaurant (1) <input type="checkbox"/> Seafood market (4)			Address: _____		
<input type="checkbox"/> Truck or roadside vendor (2) <input type="checkbox"/> Other (8) (specify): _____					
<input type="checkbox"/> Food store (3)					
7. If oysters, clams, or mussels were eaten, how were they distributed to the retail outlet? (1591)					
<input type="checkbox"/> Shellstock (sold in the shell) (1) <input type="checkbox"/> Shucked (2) <input type="checkbox"/> Unk. (9) <input type="checkbox"/> Other (8) (specify): _____					
8. Date restaurant or food outlet received seafood: Mo. <input type="text"/> <input type="text"/> Day <input type="text"/> <input type="text"/> Yr. <input type="text"/> <input type="text"/>			9. Was this restaurant or food outlet inspected as part of this investigation? Yes (1) <input type="checkbox"/> No (2) <input type="checkbox"/> Unk. (9) <input type="checkbox"/>		
10. Are shipping tags available from the suspect lot? Yes (1) <input type="checkbox"/> No (2) <input type="checkbox"/> Unk. (9) <input type="checkbox"/> (Attach copies if available)			11. Shippers who handled suspected seafood: (please include certification numbers if on tags) _____ _____		

Reporting Forms

- Complete the COVIS form for Vibrio Cases
- Fax completed form to 919-733-9555
- You or MCU staff can enter data from COVIS form into NC EDSS



Caution!
Be Careful What You Eat.

