

CRACKING THE CASE: INVESTIGATING SHELLFISH-RELATED ILLNESSES

Elizabeth Lorence
WADOH- Environmental Public Health

Agenda:

- Background info
- Model Ordinance Significance
- Washington Illness data
- What is needed before, during, and after an illness investigation
- Shellfish program actions and *Vp* closure requirements
- Summary/Lessons learned

Objectives:

- This presentation should help you understand:
  - When a shellfish field investigation is necessary and what occurs before, during, and after the report
  - Why do we need the tag information
  - What types of tags to collect and information to retrieve
  - How to prioritize illnesses and determine if a field investigation is necessary



The Why: Public Health Significance for Regulation of Commercial Shellfish

- Identify the source and remove affected product from the market to prevent illnesses
- **Quick and accurate** response is imperative

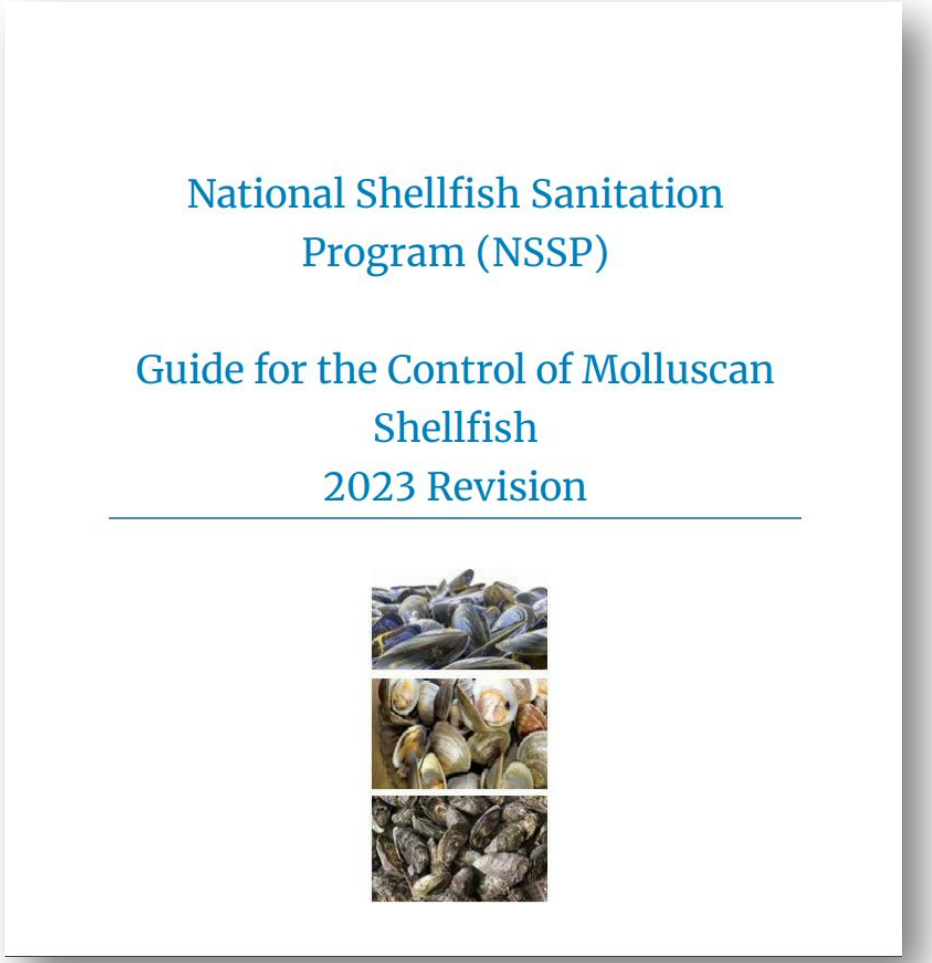




NSSP Model Ordinance

- The minimum requirements to regulate the interstate commerce of molluscan shellfish

- They establish a program to protect the public health of consumers by assuring that:
  - The sale or distribution of shellfish from safe sources
  - Shellfish have not been adulterated during cultivating, harvesting, processing, shipping or handling.

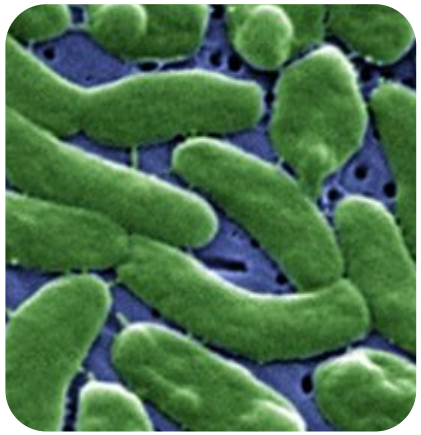


Vibrio Species Included in the MO



Vibrio parahaemolyticus

- Mainly causes acute gastroenteritis
- Wound infections can occur but less common
- *V. parahaemolyticus* causes the highest number of seafood-associated bacterial gastroenteritis in the United States and in Asian countries



Vibrio vulnificus

- Can cause 3 types of infections: Acute gastroenteritis, Necrotizing wound infections, and sepsis.
- *Vibrio vulnificus* is responsible for more than 95% of seafood-related deaths in the United States, especially among high-risk consumers with immunocompromised conditions or liver disease

Commitment to the Model Ordinance (MO) in Outbreak Scenarios

Illnesses Reported

- Once shellfish is implicated, FDA and affected states need to be notified

Shellfish Inspections

- Once the shellfish link has been established, we have **24 or 72 hours** (depending on the pathogen) to investigate implicated shellfish, conduct inspections, collect harvest records, and assess or survey growing areas

Actions and Report

- If a determination is <u>not</u> made within the required timeline, we must issue a precautionary closure of <u>all</u> implicated growing areas while investigation continues
- Implicated state reports findings to other states and FDA
- Conducts necessary closures and recalls, reports to FDA & ISSC

What Counts as an Enteric *Vibrio* Case?

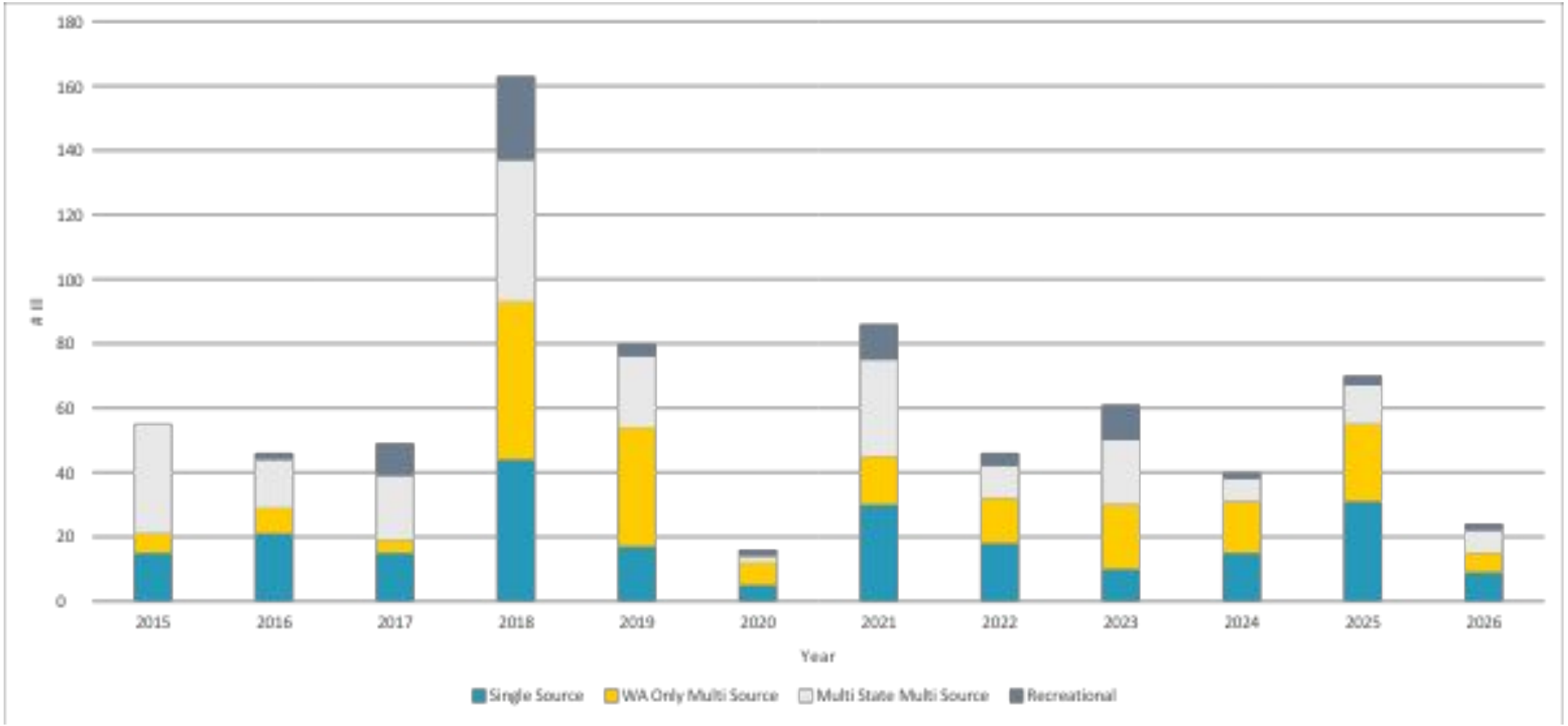
Confirmed Sporadic Cases (Single & Multi)

- ✔ Does not involved documented post-harvest abuse
- ✔ Culture confirmed *Vp*
- ✔ Occurred within the control months of May-Sept

Closure Requirements:

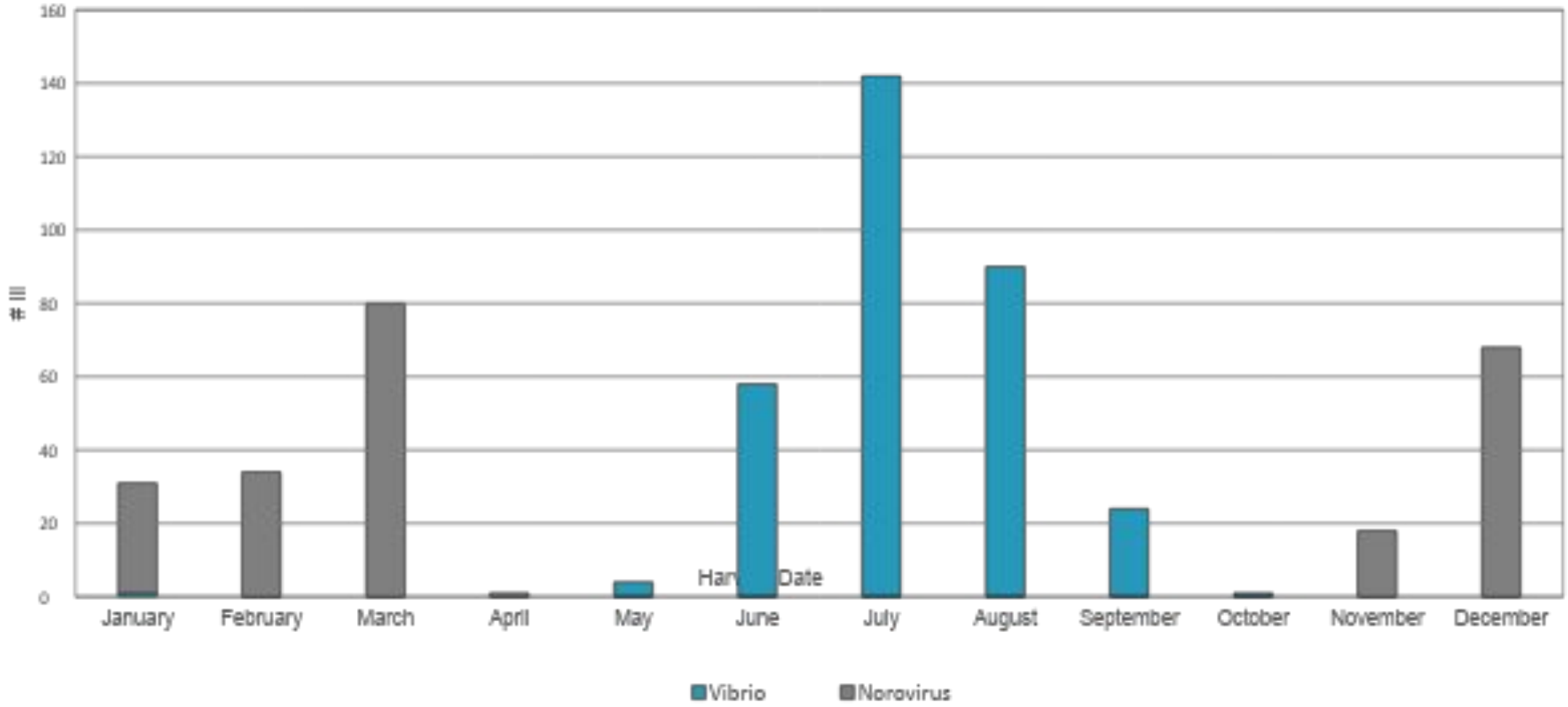
- ✔ Be associated with commercially harvested shellstock
- ✔ Not involve documented post-harvest abuse
- ✔ Can be traced back to a single growing area
- ✔ Be culture confirmed *Vp*
- ✔ Need to be either within 30-day period or same harvest dates
- ✔ Occurred within the control months of May-Sept

Confirmed *Vp* Illnesses Attributed to Washington Oyster Shellstock (by harvest date) 2015-2026*

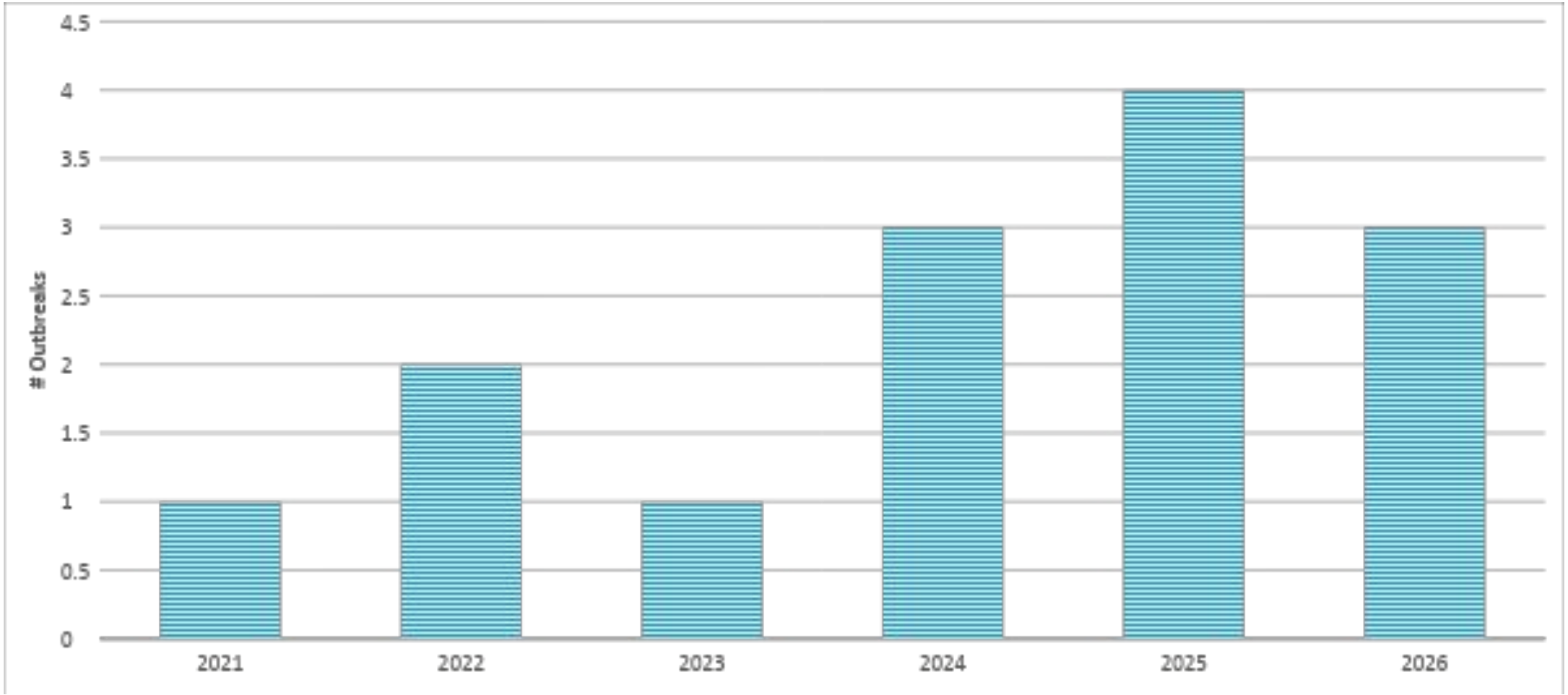


* Vibrio reports have a lag and more may come in over the next month or so

Vibrio vs Noro Seasonality 2021-*2026



Number of Norovirus Outbreaks with Washington Harvesters 2021-2026*

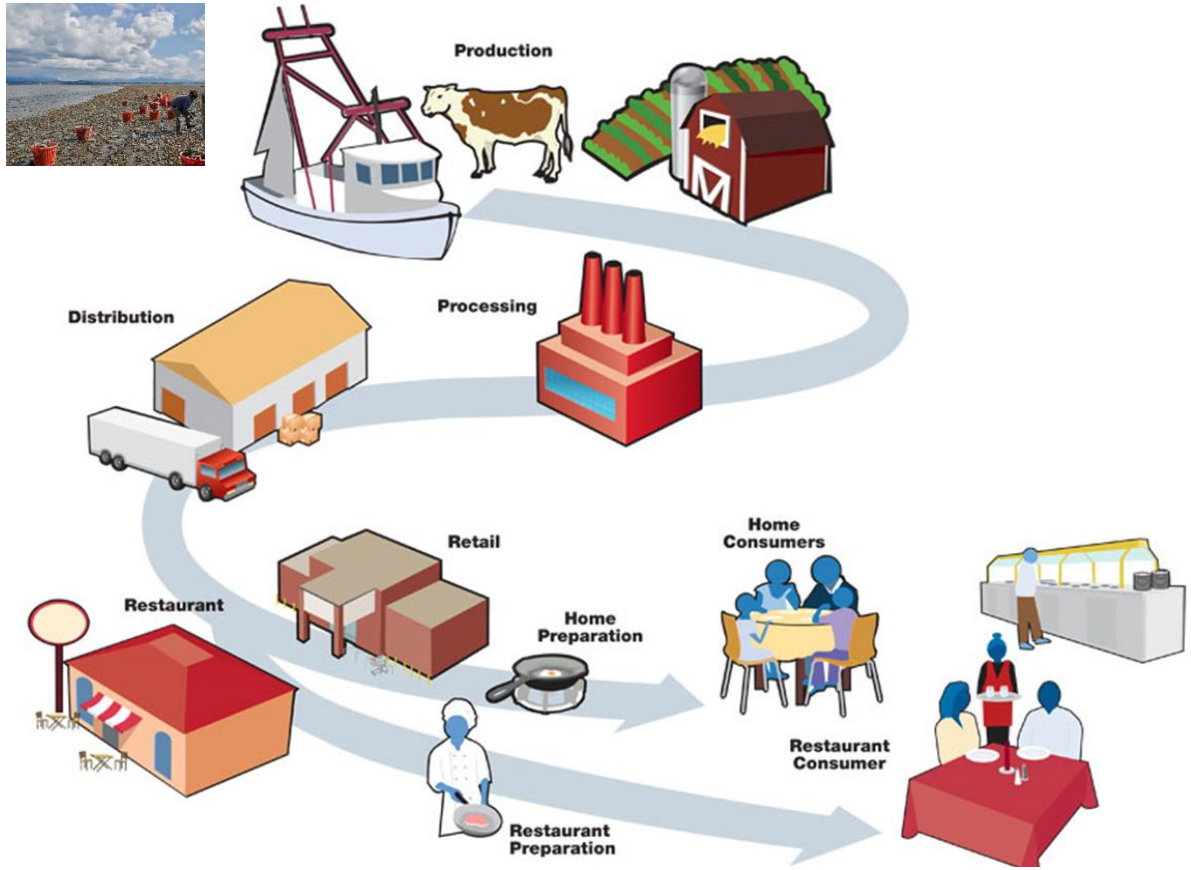


*2026 Noro season does not end until Dec 31

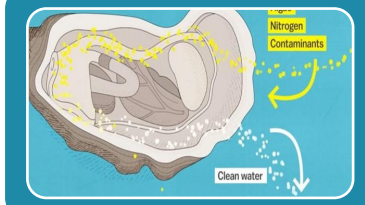
Illness Investigations

What is needed before, during, and after an illness investigation

From the Beach To the Table



Why are Bivalves riskier to consume than crustaceans and finfish?



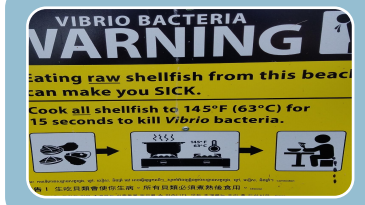
Bivalves like oysters, clams, and mussels filter gallons of seawater daily. They can accumulate microorganisms, biotoxins, and other pollutants



When a person consumes a bivalve, they eat whatever is currently in their digestive tract



DOH issues warnings about not consuming crab or lobster "butter" because biotoxins CANNOT be cooked out



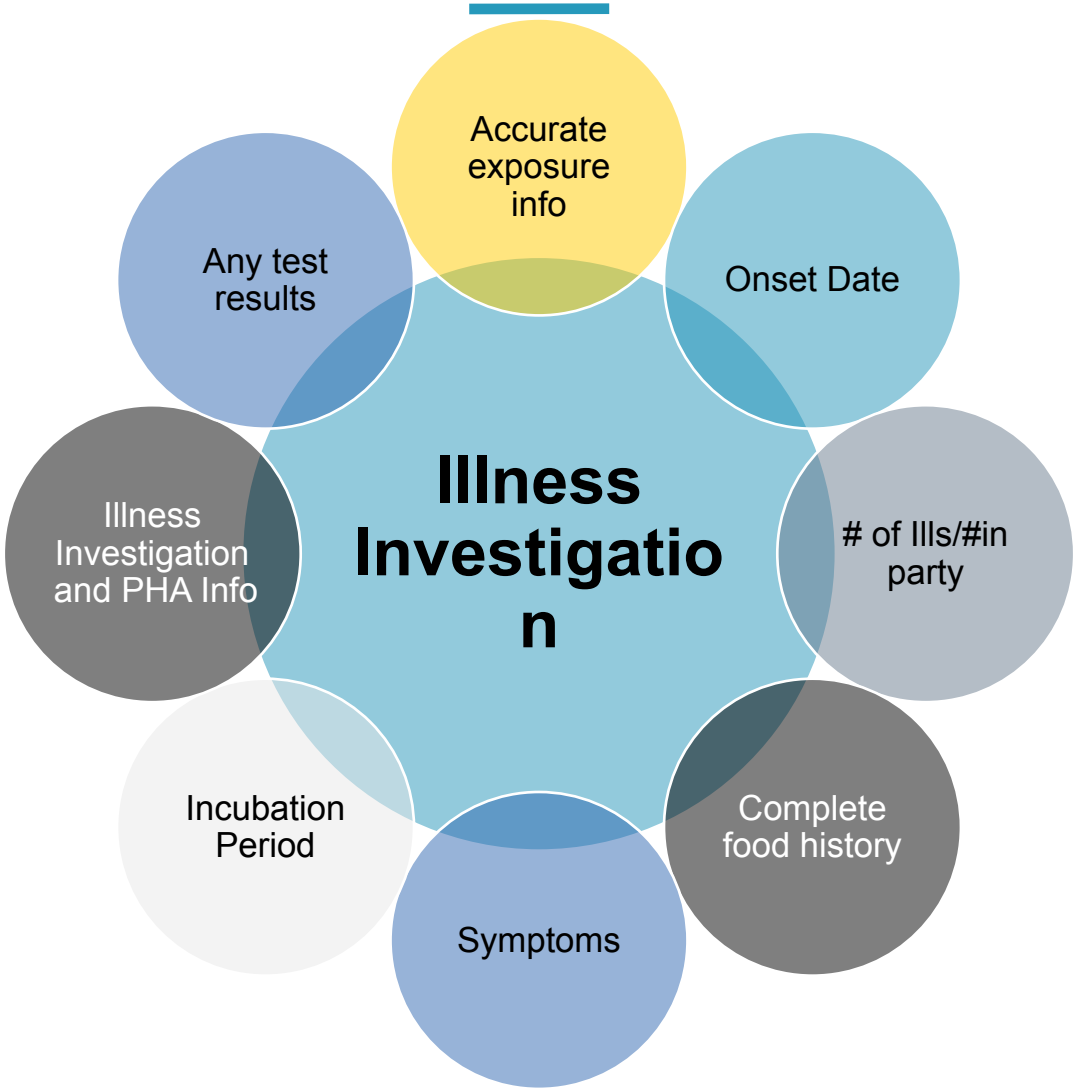
Many types of bivalves are consumed raw, which can put people at greater risk of infection from bacteria or viruses

BEFORE: How do we prioritize shellfish illness investigations?

- Culture confirmation and epi linked cases associated with seafood (esp shellfish) consumption
- Single source cases extremely high priority
- Cases that resemble biotoxin illnesses are also prioritized

Priority Ranking	Type of Seafood and Preparation	Examples
First	Raw bivalve molluscan shellfish	Raw: oysters, mussels, clams, scallops
Second	Cooked bivalve molluscan shellfish	Cooked: oysters, mussels, clams, scallops
Third	Other raw seafood	Raw: tuna, salmon, shrimp, crab, octopus, etc.
Fourth	Cooked fish	Cooked: tuna, salmon, octopus, etc.
Fifth	Cooked crustaceans	Cooked: shrimp, crab, lobster, crawfish

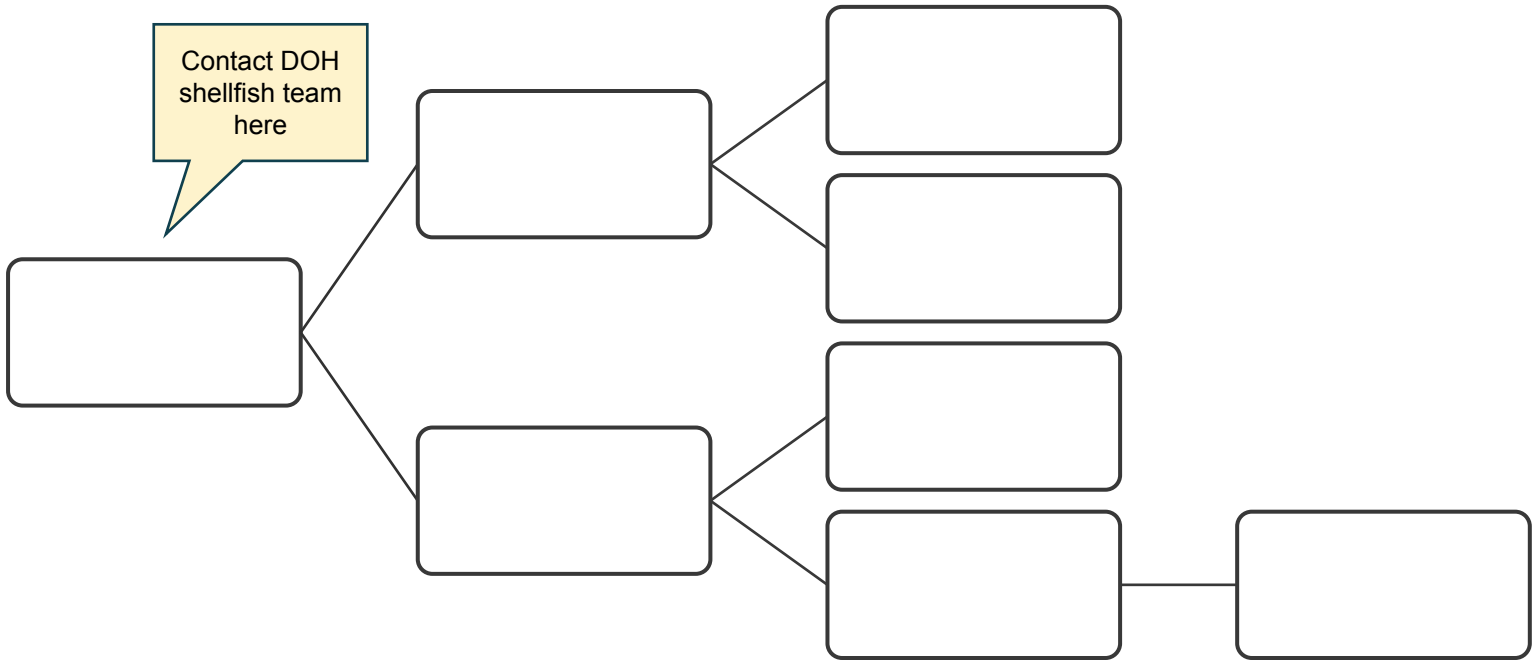
BEFORE: Prioritizing information collected during the interview



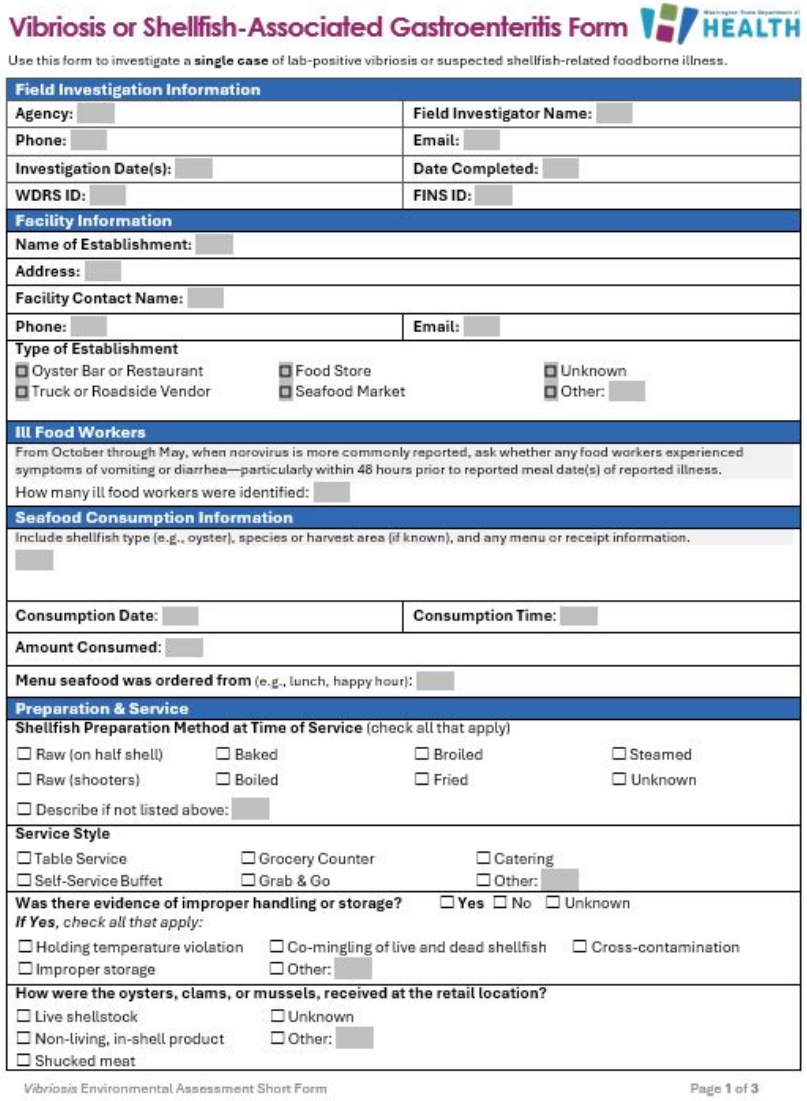
BEFORE: Determining if a field investigation is necessary

Is a field investigation necessary?

- [ ] Was raw shellfish consumed within the exposure period?
- [ ] Is this an outbreak?
- [ ] Was the case culture confirmed?
- [ ] Did the case seek medical care, or do they plan to?



Form Information



Vibriosis or Shellfish-Associated Gastroenteritis Form

Use this form to investigate a **single case** of lab-positive vibriosis or suspected shellfish-related foodborne illness.

Field Investigation Information

Agency:	**Field Investigator Name:**
Phone:	**Email:**
Investigation Date(s):	**Date Completed:**
WDRS ID:	**FINS ID:**

Facility Information

Name of Establishment:

Address:

Facility Contact Name:

Phone:	**Email:**

Type of Establishment

☐ Oyster Bar or Restaurant ☐ Food Store ☐ Unknown
☐ Truck or Roadside Vendor ☐ Seafood Market ☐ Other:

Ill Food Workers

From October through May, when norovirus is more commonly reported, ask whether any food workers experienced symptoms of vomiting or diarrhea—particularly within 48 hours prior to reported meal date(s) of reported illness.

How many ill food workers were identified:

Seafood Consumption Information

Include shellfish type (e.g., oyster), species or harvest area (if known), and any menu or receipt information.

Consumption Date:	**Consumption Time:**

Amount Consumed:

Menu seafood was ordered from (e.g., lunch, happy hour):

Preparation & Service

Shellfish Preparation Method at Time of Service (check all that apply)

☐ Raw (on half shell) ☐ Baked ☐ Broiled ☐ Steamed
☐ Raw (shooters) ☐ Boiled ☐ Fried ☐ Unknown
☐ Describe if not listed above:

Service Style

☐ Table Service ☐ Grocery Counter ☐ Catering
☐ Self-Service Buffet ☐ Grab & Go ☐ Other:

Was there evidence of improper handling or storage? ☐ **Yes** ☐ No ☐ Unknown

***If Yes**, check all that apply:*

☐ Holding temperature violation ☐ Co-mingling of live and dead shellfish ☐ Cross-contamination
☐ Improper storage ☐ Other:

How were the oysters, clams, or mussels, received at the retail location?

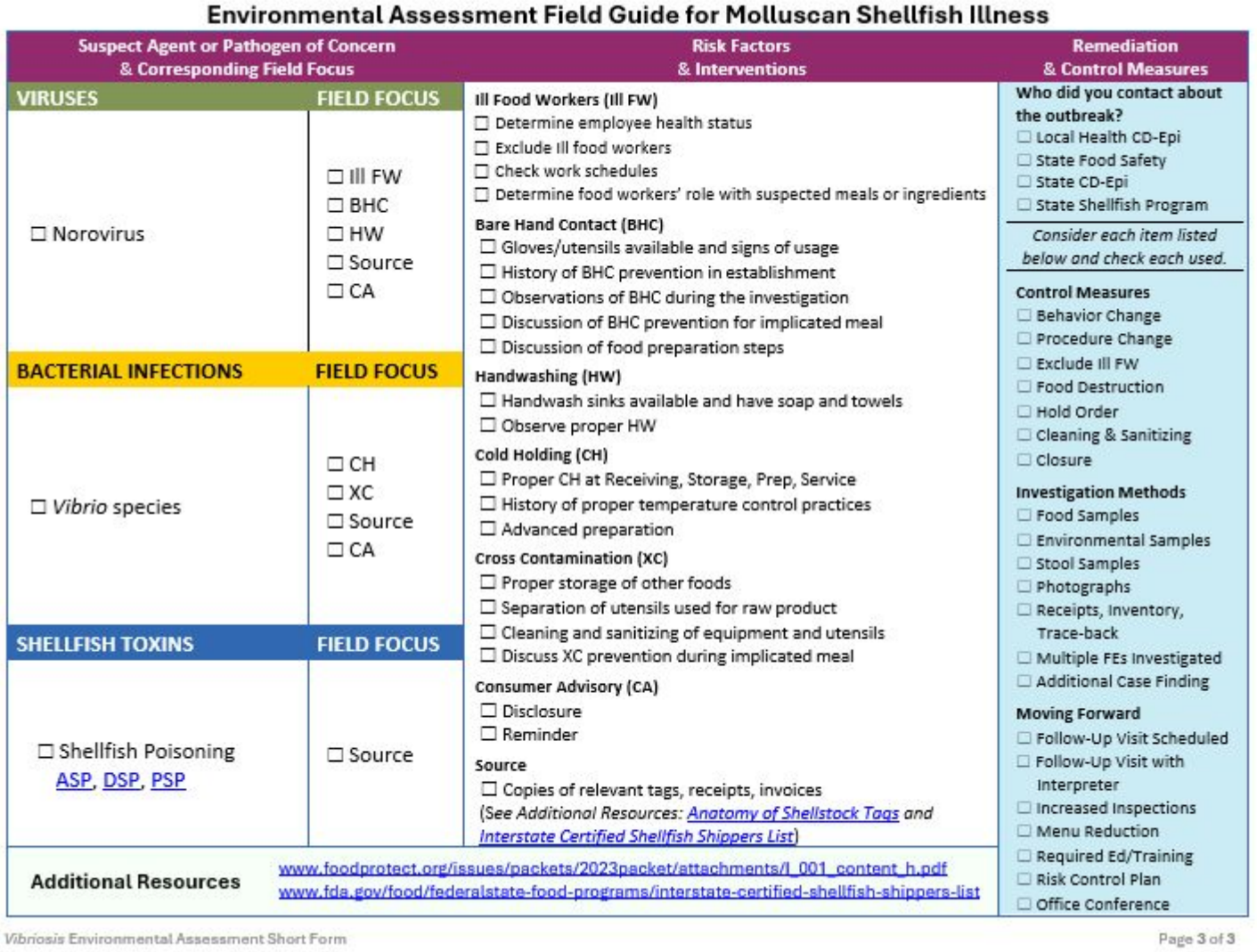
☐ Live shellstock ☐ Unknown
☐ Non-living, in-shell product ☐ Other:
☐ Shucked meat

Vibriosis Environmental Assessment Short Form Page 1 of 3

- ❑ Use this form for shellfish-associated illnesses
- ❑ Illness investigation needs to be conducted for culture confirmed VP test from shellfish consumption
- ❑ Need to rule out post harvest abuse at retail, harvest, and distribution to count as case

Form Information (Cont)

- This form is a quick guide to help identify field focus depending on suspected pathogen
- Helpful as a guide in identifying important risk factors



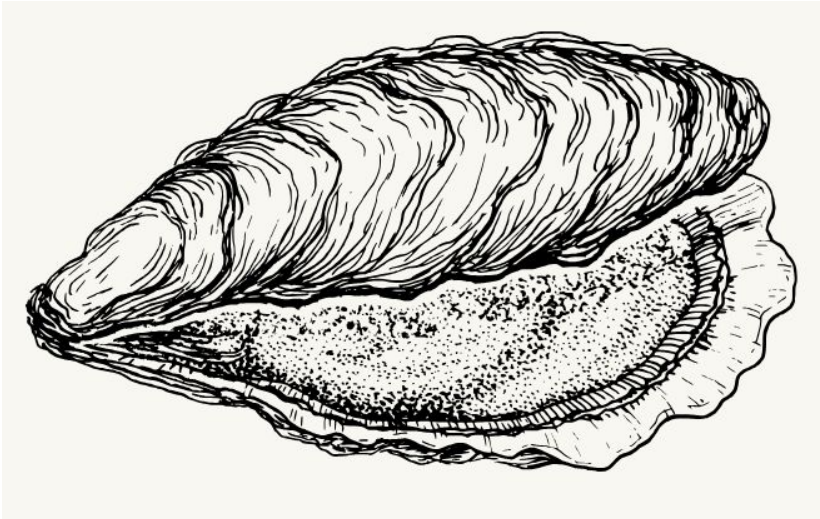
Environmental Assessment Field Guide for Molluscan Shellfish Illness

Suspect Agent or Pathogen of Concern & Corresponding Field Focus		Risk Factors & Interventions	Remediation & Control Measures
VIRUSES	**FIELD FOCUS**	**Ill Food Workers (Ill FW)** ☐ Determine employee health status ☐ Exclude Ill food workers ☐ Check work schedules ☐ Determine food workers' role with suspected meals or ingredients **Bare Hand Contact (BHC)** ☐ Gloves/utensils available and signs of usage ☐ History of BHC prevention in establishment ☐ Observations of BHC during the investigation ☐ Discussion of BHC prevention for implicated meal ☐ Discussion of food preparation steps **Handwashing (HW)** ☐ Handwash sinks available and have soap and towels ☐ Observe proper HW **Cold Holding (CH)** ☐ Proper CH at Receiving, Storage, Prep, Service ☐ History of proper temperature control practices ☐ Advanced preparation **Cross Contamination (XC)** ☐ Proper storage of other foods ☐ Separation of utensils used for raw product ☐ Cleaning and sanitizing of equipment and utensils ☐ Discuss XC prevention during implicated meal **Consumer Advisory (CA)** ☐ Disclosure ☐ Reminder **Source** ☐ Copies of relevant tags, receipts, invoices (*See Additional Resources: Anatomy of Shellstock Tags and Interstate Certified Shellfish Shippers List*)	**Who did you contact about the outbreak?** ☐ Local Health CD-Epi ☐ State Food Safety ☐ State CD-Epi ☐ State Shellfish Program *Consider each item listed below and check each used.* **Control Measures** ☐ Behavior Change ☐ Procedure Change ☐ Exclude Ill FW ☐ Food Destruction ☐ Hold Order ☐ Cleaning & Sanitizing ☐ Closure **Investigation Methods** ☐ Food Samples ☐ Environmental Samples ☐ Stool Samples ☐ Photographs ☐ Receipts, Inventory, Trace-back ☐ Multiple FEs Investigated ☐ Additional Case Finding **Moving Forward** ☐ Follow-Up Visit Scheduled ☐ Follow-Up Visit with Interpreter ☐ Increased Inspections ☐ Menu Reduction ☐ Required Ed/Training ☐ Risk Control Plan ☐ Office Conference
☐ Norovirus	☐ Ill FW ☐ BHC ☐ HW ☐ Source ☐ CA		
BACTERIAL INFECTIONS	**FIELD FOCUS**		
☐ *Vibrio* species	☐ CH ☐ XC ☐ Source ☐ CA		
SHELLFISH TOXINS	**FIELD FOCUS**		
☐ Shellfish Poisoning ASP, DSP, PSP	☐ Source		
Additional Resources	www.foodprotect.org/issues/packets/2023packet/attachments/I_001_content_h.pdf www.fda.gov/food/federalstate-food-programs/interstate-certified-shellfish-shippers-list		

Vibriosis Environmental Assessment Short Form — Page 3 of 3

BEFORE: Prepare for a field investigation for a shellfish illness

- ✔ The exposure date and time
- ✔ The name and the location of the restaurant
- ✔ Which menu did the case order from?
- ✔ Type of shellfish, and the name of the menu item or how it was prepared
- ✔ Any additional seafood consumed at the meal
- ✔ The brand name of the shellfish is helpful, as well as any pictures of the meal or identifying information to look up receipts
- ✔ Any food items that any additional ills may have shared

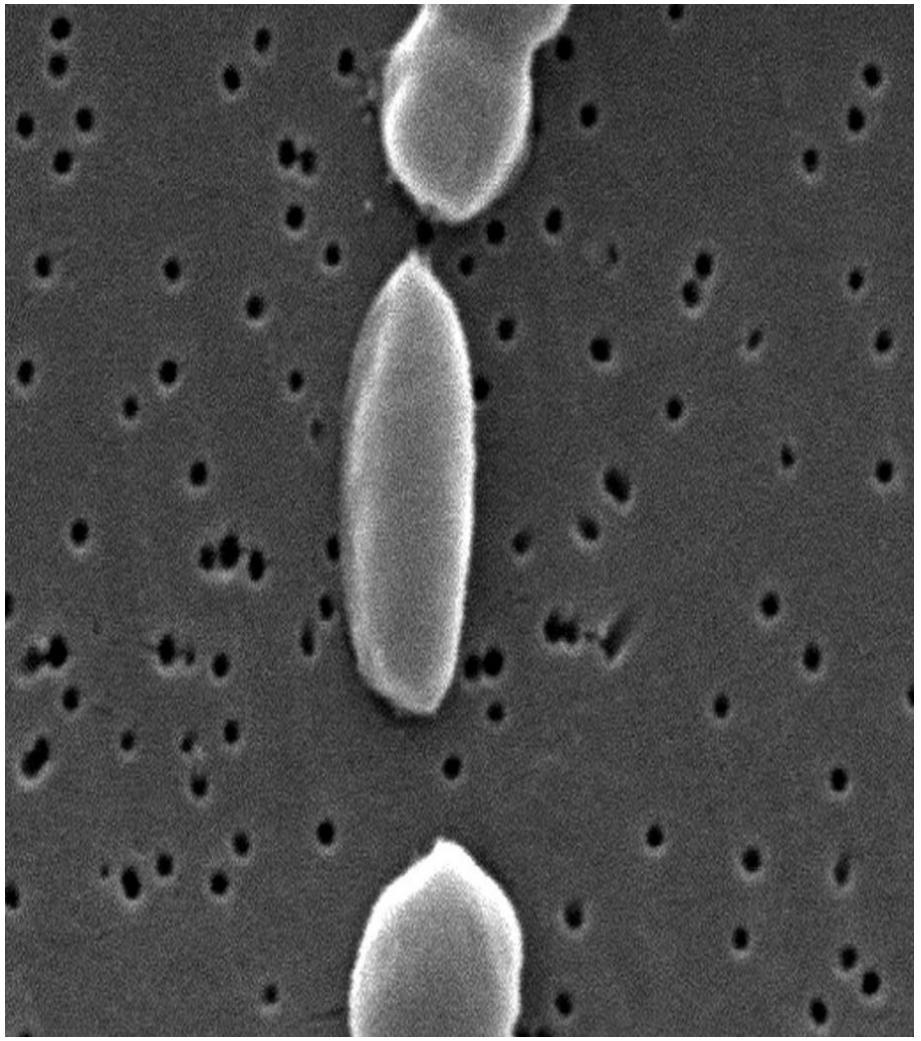


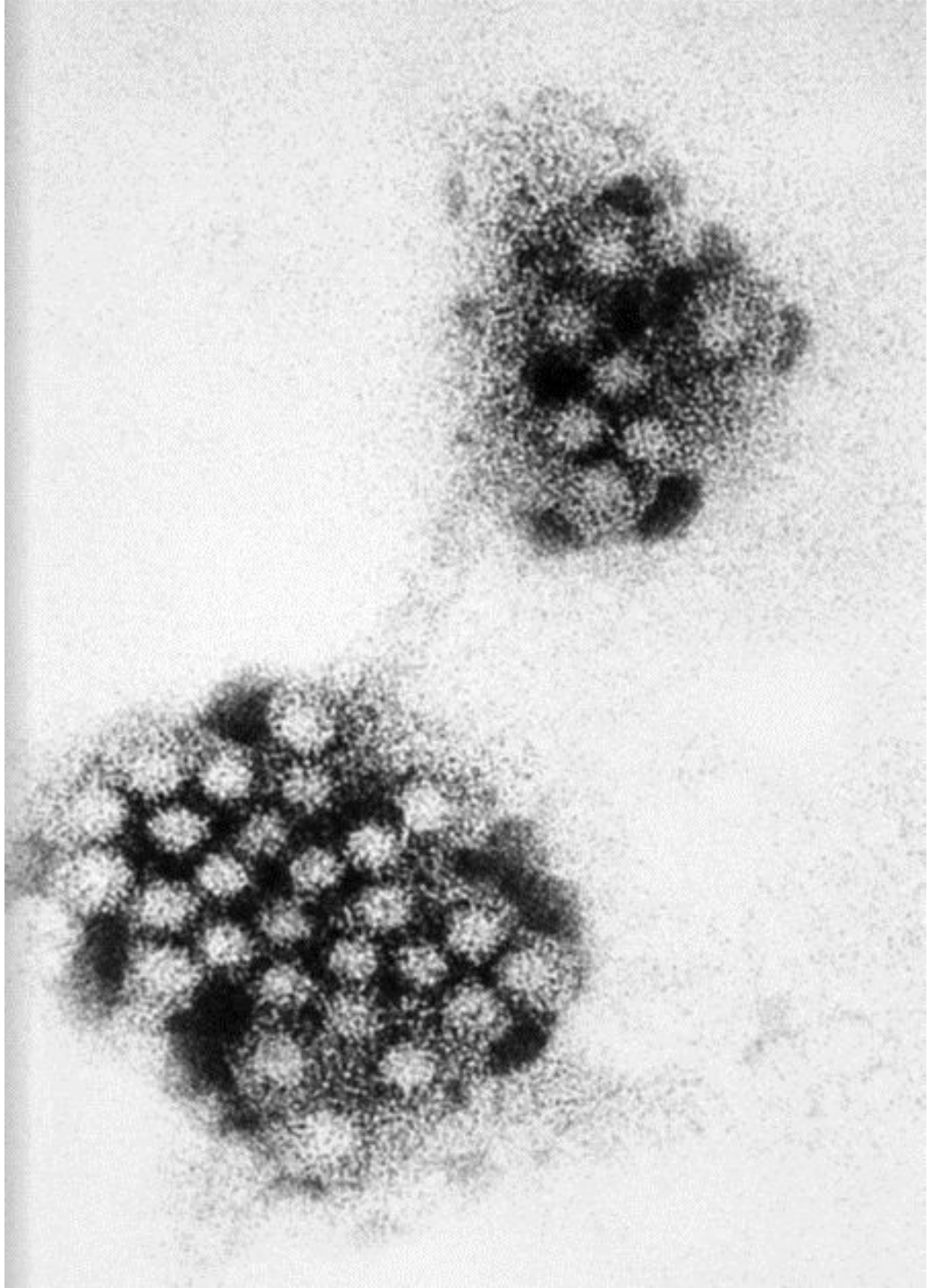
Illness Investigation Differences

Pathogen	Pathogen Type	Case Definition	Closure Threshold/ Outbreak Definition	Environmental Influences	Investigation Timeline	Notifiable Disease	Inspection Focus
Vibrio	Bacteria- can continue to grow in ideal conditions	Needs to be culture confirmed	Tiered closure requirements based on # of Illnesses	Temperature dependent, not transmissible person-to-person	72 hours	Yes, case should be in WDRS is tests positive for any *Vibrio* spp.	Food history and temperature and storage logs, comingling
Norovirus	Virus- Needs a host to replicate	Can be epi-linked	Two or more illnesses from different households	Fecal-oral, high secondary infection rate	24 hours	Not notifiable (only in some outbreak situations)	Cross contamination, ill food workers
Biotoxins	Chemical toxin- produced by some phytoplankton species	Can be epi-linked	One case initiates a closure	Often correlated to increased numbers of specific phytoplankton species, not transmissible person-to-person	24 hours	Yes, case should be in WDRS if saw doctor	Source information, comingling, improper record keeping

DURING: Key areas to evaluate during a field investigation for *Vibrio*

- ❑ Are shellfish holding and receiving temperatures recorded and within the acceptable range and refrigeration units working?
- ❑ Is an accurate thermometer used to evaluate temps?
- ❑ Was commingling of live and dead shellfish observed?
- ❑ Were there handling practices that could transfer contamination between shellfish? (e.g., between oysters from different sources or growing areas, shell stock and pre shucked oysters, or cooked and raw product)
- ❑ Is there an appropriate consumer advisory on the menu?
- ❑ Be sure to evaluate all menus available such as online, to go, happy hour, dinner etc.
- ❑ Are only approved sources is being used?

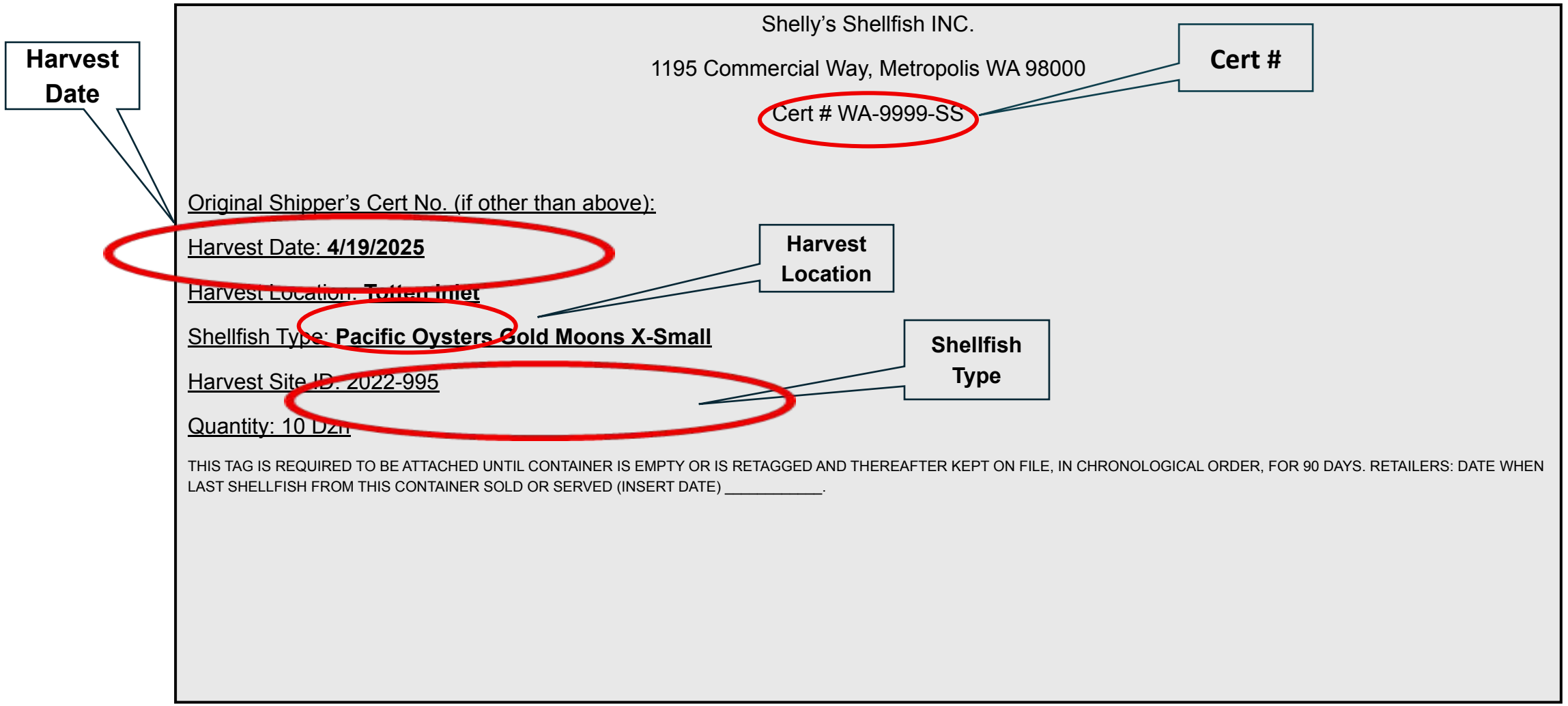




DURING: Key Areas to Evaluate During a Field Investigation for Norovirus

- Are there any ill food workers or have there been in the week around the reported illness?
- Are there handling practices that could transfer contamination between different oysters, bare hand contact, or other food items?
- Are restroom facilities working and kept clean?
- Were handwashing signs visible and sinks accessible and available?
- Were surfaces clean, and shucking knives being stored properly
- Dishwashing stations and machines in good working order

Shellfish Tag Explanation



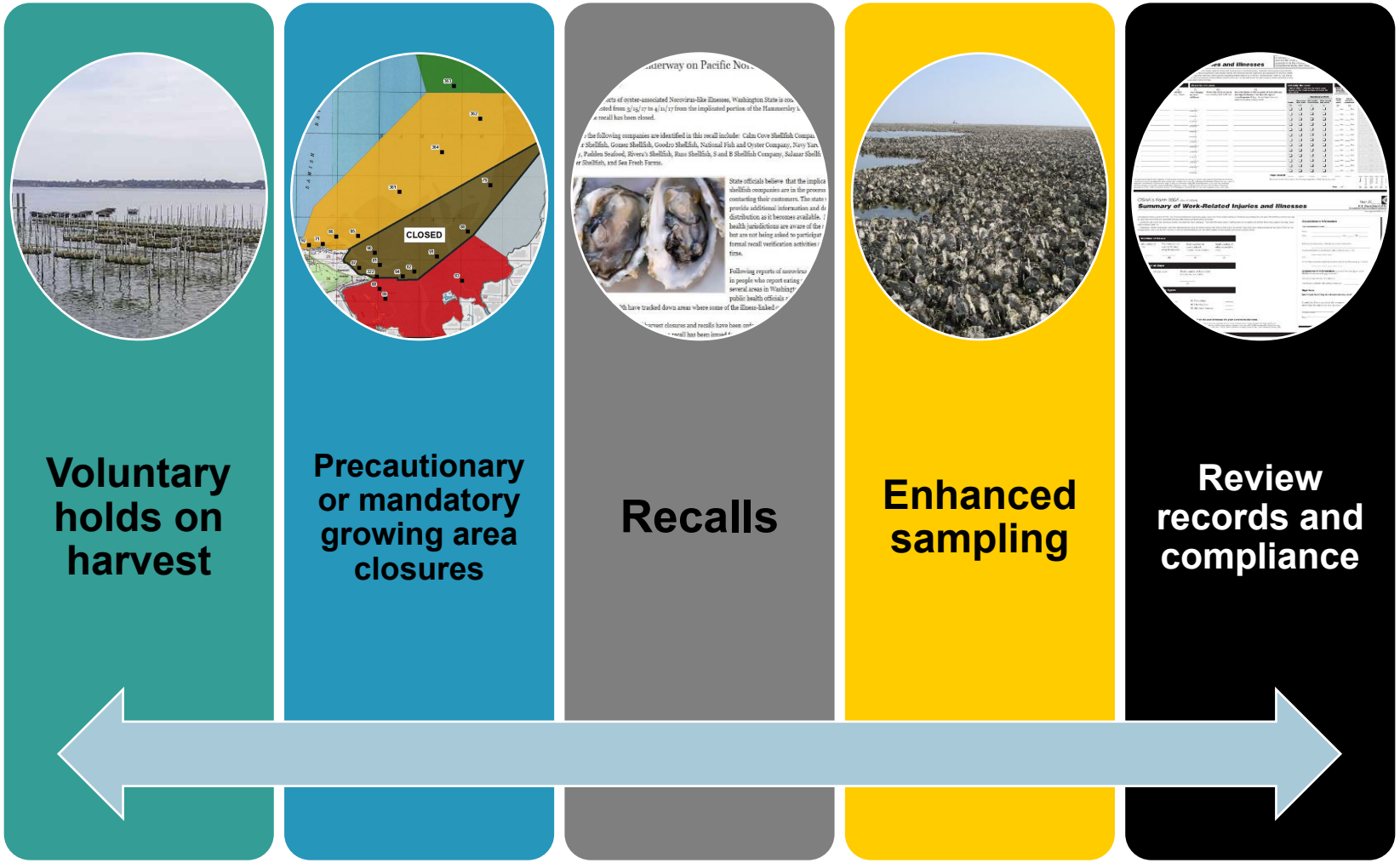
DURING: Important that only the correct shellfish tags are collected and readable:

Things to REMEMBER when collecting and sending tags:

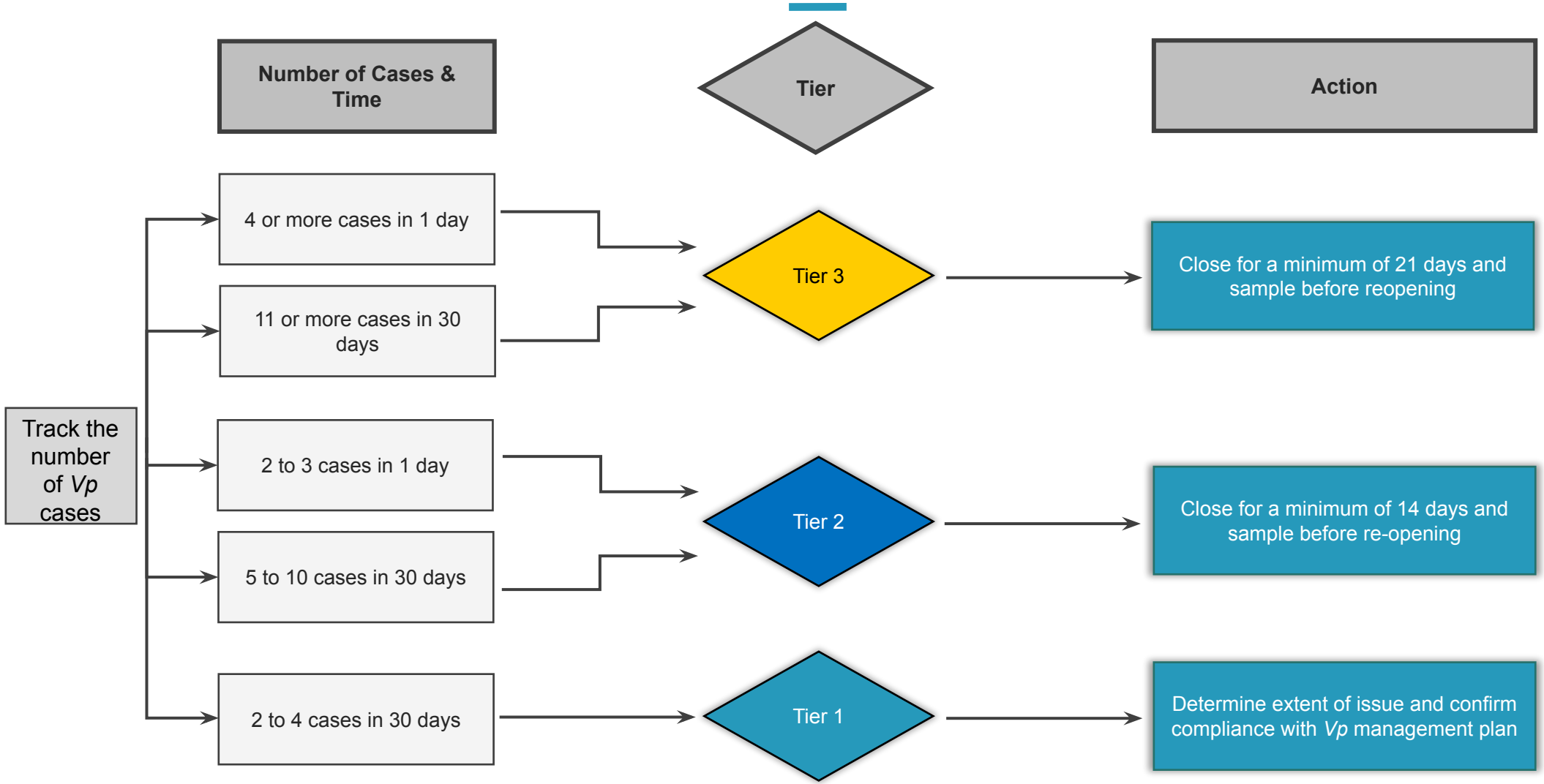
DURING: Important that only the correct shellfish tags are collected and readable:

Things to AVOID when collecting and sending tags:

AFTER: Shellfish program investigation potential actions



AFTER: Model Ordinance closure requirements for *Vibrio parahaemolyticus*

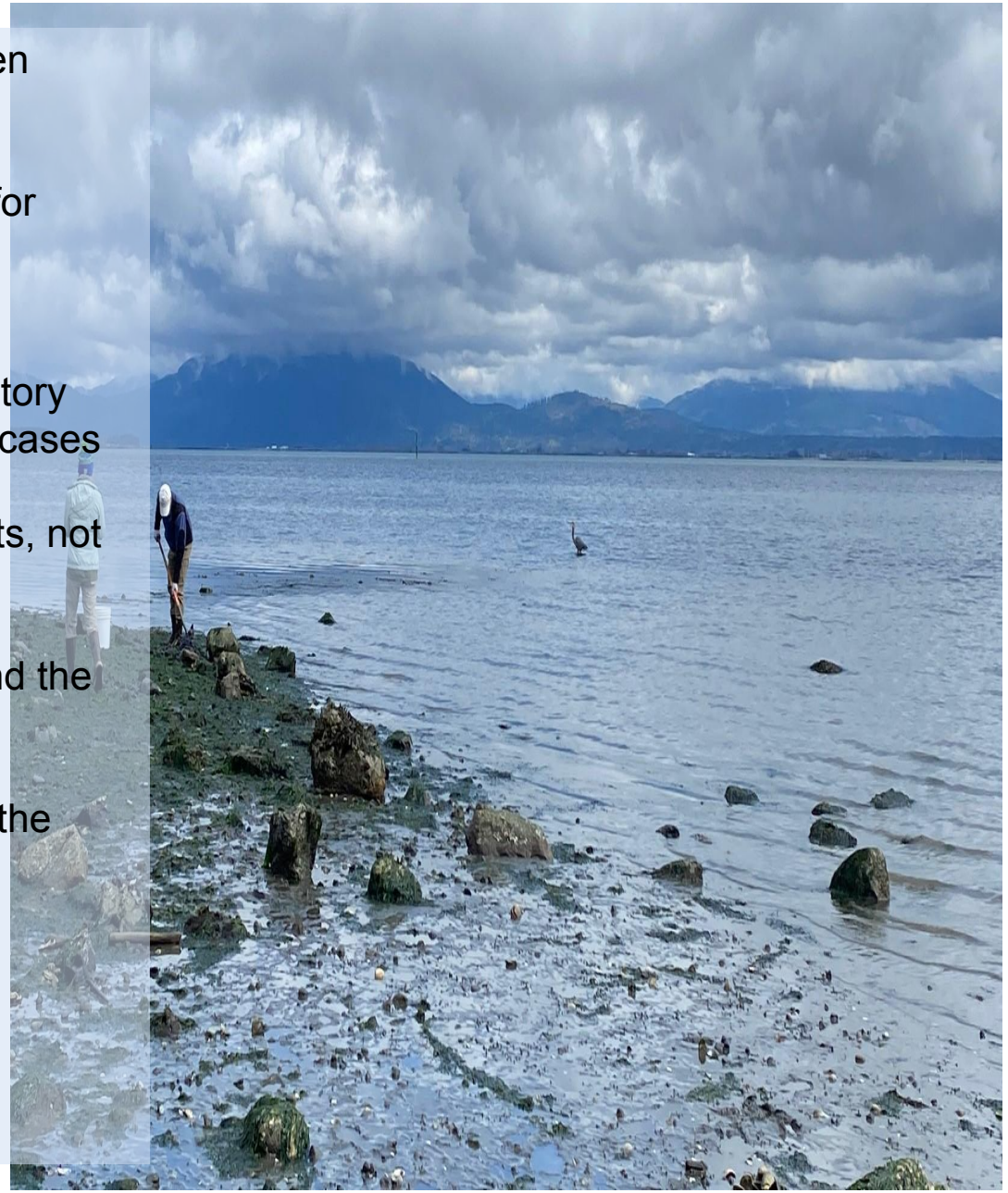


WA FINS (Foodborne Illness Notification System)

- WHO: Public reporting system for Foodborne illnesses. Helps connect health departments statewide to investigate foodborne illnesses.
- WHAT: FINS is a notification system, created by WADOH to inform statewide health departments of foodborne illnesses.
- WHEN: People often associate their illness with their last food consumption, but it is important to note that food history of up to three days prior to illnesses helps to track sources. It is not too late to report the illness, even if you have recovered.
- WHERE: Go to the DOH.wa.gov website and navigate to the foodborne illness section to use this link Foodborne Illness Notification System (FINS)
- WHY: Notification of foodborne illnesses helps health departments track illnesses and identify trends. Reporting illnesses can help prevent or stop outbreaks.

Summary and Lessons Learned

- ✔ Tag collection and readability is an issue, remember key items when collecting and sending tags
- ✔ Distribution and tag information is important to pass along quickly for traceback purposes (FDA does not issue recalls) and regulatory requirements
- ✔ Incomplete exposure information reported, need complete food history and numbers of ills/total people in party, as well as any secondary cases
- ✔ Reduce confusion on what forms to fill out and when to do site visits, not every illness will require inspection, please report asap
- ✔ The new FINS system requires a collective effort between LHJs and the State to ensure correct information.
- ✔ Collaborative conversations between LHJS and states throughout the investigation is key, CANNOT DO IT WITHOUT YOU!
- ✔ When in doubt, reach out!



Video Resources

Tracing the Source: Conducting a Vibrio Illness Field Investigation

Tracing the Source: Investigating a Vibriosis Case

Thank you!

QUESTIONS?



Beth Lorence, MPH

Shellfish Illness Prevention Coordinator

Shellfish Licensing & Certification Section

Environmental Public Health

Washington State Department of Health

Elizabeth.Lorence@doh.wa.gov

360-972-6911| www.doh.wa.gov

sf.illness@doh.wa.gov



