

1) **Q:** Do you ever see vibrio gastroenteritis from swallowing water or licking water off lips?

A: We do get cases of gastroenteritis who deny having any seafood exposure and some of these could potentially be due to swallowing sea water or brackish water. I just don't think its very common.

2) **Q:** Is there any data on viable living conditions for these organisms, in terms of temperature thresholds in water? (ie. what water temperatures propagate growth vs inhibit growth?)

A: *Vibrio parahaemolyticus* is found on east and west coasts. *Vibrio vulnificus* is found in warmer regions. We have *vulnificus* on both coasts, but we see more cases associated with the Gulf states. There is data on this.

Nate Deardorff: In Alaska, if the water is above 60F then the oysters must be cooled within a specific time frame. If water temp is below that the oysters can be harvested and held cold. Alaska has a *Vibrio* control plan that addresses our cooler waters.

I know *Vibrio* can be in a pseudo "dormant" state when temps are below ~50-55 degrees F and once the temps get back up they start growing again.

Laurie: One issue with *Vibrio* is, they can also go into a viable but not culturable state when they get too cold, so keep that in mind. We had that issue with being able to regrow isolates that have been frozen.

Vi Peralta: You can also refer to the FDA Bag Bug Book (<https://www.fda.gov/media/83271/download>) which does mention optimal temperatures for specific *Vibrio* species. For *Vibrio parahaemolyticus*, optimal is 20C to 35C but can grow up to 41C. Inactivated at temperatures below 10C

Lisa Yee: I have read that temperature influences the *Vibrio's* ability to float in warmer temperatures and sink into the sediment in cooler temperatures, but I don't have a citation off hand at the moment.

3) **Q:** CIDT diagnoses cannot be considered confirmed without a culture, is that correct?

A: That is correct. The case definition for *Vibrio* requires a culture confirmation. So if it's just CIDT (or PCR) positive, it is a probable case.

4) **Q:** How specific should the body of water description be?

A: You want to get as specific as geographic area as possible. I would say it was at a state park; I wouldn't say Puget Sound, for example; it's way too general. When people are recreating it's often that's at some kind of a park or beach and so just use that name of the park, beach or even intersection if possible.

5) **Q:** If the same lot of oyster that was consumed by the patients are still available at retail, is it recommended to impound the lot?

A: I do not believe so. I haven't encountered anyone having impound a lot. Mostly because you don't know for sure if the illness is attributable to that. It is not recommended to impound the lot but check with your local foodborne program.

Heather Watson says that they have impounded a lot. I [Laurie] would check with your local food safety program, and find out if they want you to do that.

Susan Seiler shares that California Retail Food Code requires untagged shellfish to be impounded. [Laurie] Untagged shellfish is a different question. One of the steps in the investigation was to identify/confirm the approved source. Untagged is, by definition, from an unapproved source. Some restaurants will have their tags in quite a bit of disarray, and it would be really hard to tell which shellfish was sold on different dates. That's one issue that has come up.

6) **Q:** Are the oyster farms doing surveillance of their own in their harvesting waters?

A: There is environmental testing for *Vibrio* species. The problem with doing environmental testing for *Vibrio* species is that not all species of *Vibrio parahaemolyticus* are pathogenetic. Not all species of *Vibrio vulnificus* are pathogenetic. It's just a piece of a puzzle. Washington state does a lot of environmental testing, they do a lot of shellfish testing. But what they're looking at for markers, indicators of increased pathogenetic *Vibrio*. But because there's so many other variables like was the shellfish harvested in the middle of the day. Was that tide especially low that day; Was the temperature especially high that day? It's just a piece of the puzzle.

I believe that the larger companies are doing their own surveillance. But then again you can't necessarily tell just by testing for *Vibrio parahaemolyticus* in the oysters whether they [the organisms] are pathogenic. You have to look for pathogen markers.

7) **Q:** What is the medical treatment?

A: Most people will get better without treatment. But if they go to the doctor, often they would get prescribed antibiotics, but most people will get better without treatment. If you have severe illness such as septicemia, or really bad skin infection, you will get treatment, you will [likely] get antibiotics.

8) **Q:** For environmental health field investigations, sometimes restaurants have shellfish that was purchased from a market. So, they do not have the tags for the shellfish. Would you recommend doing an investigation of the market where they purchased the shellfish to do the traceback study?

A: I think they should always have tags. So if they don't have tags, I'd go back to that market and figure out why they aren't keeping the oysters [which is a violation].

9) **Q:** Where the COVIS form asks for the shipping certificate numbers there are several, do you know which ones they actually need?

A: I just put on all the ones that I have. What I do sometimes is I will actually copy that from the information I get from my shellfish program, and I'll paste it into a word document and attach that to the COVIS form. So I know the COVIS form doesn't have a lot of room for those certificate numbers and that's what I will do. They also don't have a lot of room for dealers and a lot of other information, so I sometimes will attach a page.

10) **Q:** To clarify, when there are several shippers listed, which ones are the most important to ID on the COVIS form? Or do we try and list all of them? I quickly run out of space for this.

A: Try to list all of them. It's the same question, so I will put those on a separate page, and I will attach that to the COVIS form. I think it's important to have all of those. Again though, I think CDC put them into the system which is great, but those really need to be sent to the regulatory agency that regulates the shellfish in that region where they were harvested.

11) **Q:** I have referred operators back to their distributors when we are investigating, and they do not have the tags. Is this something you recommend?

A: Yes. They should always have tags. If they don't have tags that's a problem, because the whole idea is to be able to trace back. So if the distributors haven't provided tags, then that's definitely a problem.

Heather Watson: Yes, they should have the tag, but this is not always what we find.

Laurie: That's a good point. They should have the tag, you will not always find the tags. Or you may find the tags and you'll be very challenged to figure out which one goes with the shellfish that were sold on the day you're asking about.

Jenafer Forester: We find that sometimes the supplier can fill in the gap with regards to missing tags and this is helpful.

Laurie: That's where you would get the invoices. And sometimes you can put two and two together by using invoices, and put that together to find tag information.

12) **Q:** Can you please revisit the different diagnosis options and why WGS is not very accurate?

A: So you can either do culture or CIDT (PCR) testing for stool. Culture gives you an isolate, and PCR testing just says it was detected, yes or no. Culture positive cases are confirmed, and PCR positive cases are probable. Whole genome sequencing, it's not that it's not very accurate; it's just not as specific, particularly for *Vibrio* in shellfish.

13) **Q:** If an end user (restaurant) purchases a product wholesale from a distributor (including a seafood market) the seafood market is required to provide a tag? I am not clear on that.

A: I believe that they should always have tags.

Susan Seiler: We require 90 days of tags in chronological order.

Laurie: I would check with your particular state. Each state has their retail food code. And check and see what that retail food code is.

Emily Hovis: FDA Model Food Code 3-202.18: (B) A container of SHELLSTOCK that does not bear a tag or label or that bears a tag or label that does not contain all the information as specified under (A) of this section shall be subject to a hold order, as allowed by LAW, or seizure and destruction in accordance with 21 CFR Subpart D - Specific Administrative Decisions Regarding Interstate Shipments, Section 1240.60(d).

14) **Q:** Will freezing bivalve actually kill all *Vibro*?

A: I would not count on freezing. Freezing is not considered a kill step for *Vibrio* in shellfish

15) **Q:** If they ate shellfish and also were in the water do you perform an investigation into both sources?

A: No, you only do an investigation for the shellfish if it's gastroenteritis. If it's skin infection and they ate shellfish, you only do the investigation for the water.

16) **Q:** Any data on vibrio cases associated with shellfish holding tanks at markets?

A: There definitely could be post harvest abuse, there could be temperature problem in shellfish at markets. Also, we have seen *Vibrio vulnificus* infections associated with tilapia held in live tanks at markets. The cases were people who purchased tilapia from live tanks, injured themselves while handling them and developed skin infections.