Algae that turned toxic stumps scientists

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For years, when Washington state health officials tested shellfish for toxins produced by microscopic algae, they zeroed in on two types of poisons.

Now there are three.

The state Department of Health reported this month that a family on the Olympic Peninsula was the first ever in the United States to contract diarrhetic shellfish poisoning (DHS). A man and two children became sick from eating mussels contaminated by a naturally occurring biotoxin in Sequim Bay.

The toxin is produced by a family of marine phytoplankton, Dinophysis, that has been tracked in Washington waters for decades, but has never sickened anyone. The same family of organisms has caused illnesses in Europe and Japan for decades.

Marine-algae experts are struggling to figure out why it suddenly became poisonous here.

"What's making this happen now? That's the $100 million question," said Vera Trainer, a harmful-algal-bloom expert with the Northwest Fisheries Science Center, operated by the National Oceanic and Atmospheric Administration. "You might as well ask why did the dandelions bloom in your yard last year and not this year. It's probably a variety of factors."

The arrival of this strain of biotoxin comes with more questions than

answers and is likely to complicate the lives of shellfish gatherers and health officials.

Unlike Washington's more common shellfish illnesses - the potentially deadly paralytic shellfish poisoning and amnesiac shellfish poisoning - the harmful strain of Dinophysis changes sodium levels in the stomach and causes nausea, vomiting, diarrhea, cramps and chills. Symptoms usually are gone within days.

But the state does not yet have an efficient way to regularly test waterways or shellfish for DHS. Detailed analysis requires sophisticated and expensive machinery the state hasn't needed.

"We're going to have to do some kind of additional monitoring," said Jerry Borchert, shellfish expert with the state Department of Health. "But currently our state doesn't even have the right equipment."

For now, state and federal agencies have closed Sequim Bay to harvests of manila clams, Pacific oysters, mussels and littlenecks. They've sampled shellfish areas in Puget Sound and along the coast - particularly areas where commercial companies produce mussels, which seem to concentrate the toxins faster.

Those samples have been sent to a U.S. Food and Drug Administration laboratory in Alabama, which is expected to provide results this week. That could result in more shellfish closures. Or not.

In the meantime, scientists are scrambling to understand what Dinophysis is doing here.

The study of harmful algal blooms is complex. Dinophysis, in particular, are difficult organisms. Experts around the globe hadn't been able even to grow them in laboratories until South Korean researchers figured that

out in 2006.

Plus, they are weird little critters. Some, but not all, individual species create toxins. Some are only poisonous sometimes. And it's not at all clear what determines when they change.

"I have books from back in the 1930s that show pictures of this same organism," said Rita Horner, a research scientist and algae specialist at the University of Washington.

"I personally have knowledge of it being here since the 1960s. The algae isn't new. Just the toxin is new. But we don't know enough about the biology of the organism itself to know what caused it to change."

Said Bill Cochlan, an oceanographer and phytoplankton expert at San Francisco State University: "You can have blooms and it's not a problem, or you can have blooms that are a real problem. The Number One question is when and why are they toxic?"

While no one in the United States had gotten sick before this summer, Dinophysis actually had produced toxins in U.S. waters in recent years. A bloom off Texas in the Gulf of Mexico shut down a shellfish festival. And researchers doing pilot studies in Puget Sound found the toxin here the past two years.

Cochlan and Trainer suspect the change may have something to do with back-to-back cold, wet springs. Dinophysis typically appear after spring blooms and can travel up and down the water column - heading toward sunlight at the surface for photosynthesis and diving deep to suck up nutrients.

The crazy abundance of fresh water powering into Northwest marine waters the past two years has helped stabilize the water column, perhaps

making it more attractive for Dinophysis.

No one really knows. But all three scientists suspect it's unlikely we've seen the last of this biotoxin.

"Whether this is one bad year and next year we'll go back to something else ... your guess is as good as mine," Trainer said. "But my guess is something out there has changed and we'll see this again."