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Paralytic Shellfish Poisoning Update — Alaska, 1993–2021

Background

Paralytic shellfish poisoning (PSP) is a serious and potentially fatal neuroparalytic condition caused by consumption of neurotoxins collectively known as saxitoxins. Saxitoxins are produced by marine dinoflagellate algae that proliferate in events known as harmful algal blooms (HABs) when environmental conditions are optimal. These HABs can result in widespread shellfish contamination. Although PSP cases are uncommon, Alaska has one of the highest PSP case rates in the U.S.¹ This is likely due to a combination of factors including a large coastline, abundant shellfish populations, and environmental conditions conducive to HAB formation. This *Bulletin* presents an update on the epidemiology of reported PSP cases in Alaska during 1993–2021.

Methods

PSP case classification methods were consistent with those described in a prior *Bulletin*.²

Results

During 1993–2021, the Section of Epidemiology (SOE) received 132 reports of PSP cases comprising 79 incidents (median: 1 case per incident; range: 1–7). Reported PSP incidents have varied considerably by year (Figure 1), ranging from 0–15 incidents annually. Reports of PSP incidents have declined over the last 10 years from 17 during 2012–2016 to 4 during 2017–2021, a decline of 77%.

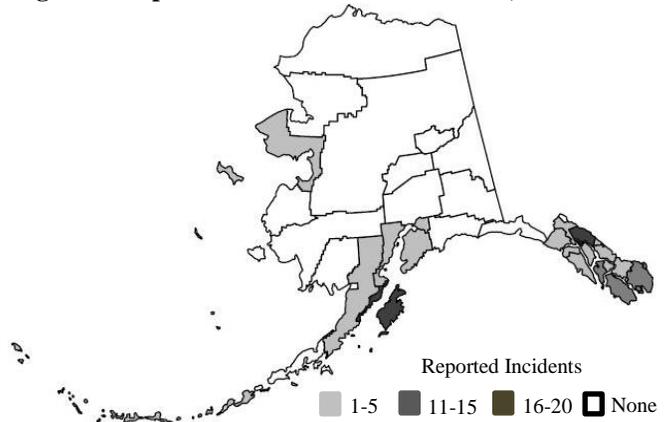
Of all PSP patients, 74 (56%) were male and the median age of patients was 42 years (range: 2–83 years). Of the 85 patients for whom race was recorded, 45 (53%) were Alaska Native, 22 (26%) were Asian, and 18 (21%) were white. Five fatalities were reported in 1994, 1997, 2010, and 2020. Most surviving patients (104, 82%) required medical attention; of these, 6 (5%) patients required intubation. While PSP incidents occurred during every month of the year, 55 (69%) incidents occurred during April–July. Most incidents occurred in the boroughs of Kodiak Island (20, 25%), Juneau (16, 20%), Ketchikan (11, 14%), and Prince of Wales-Hyder (11, 14%) (Figure 2).

Butter clams were the most frequently implicated shellfish consumed in 28 (35%) of reported PSP incidents, followed by mussels (14, 18%) and cockles (14, 18%); 11 (14%) incidents were associated with eating more than one shellfish species.

Discussion

While most PSP cases are reported during the spring and summer months, cases have been reported during every month of the year in Alaska. Reasons for the recent decline in reported PSP cases are unclear but might be due in part to declines in subsistence shellfish consumption,³ improved community awareness of PSP risk, and/or decreased reporting of suspected PSP cases. It's important to note that this decline is not indicative of reduced PSP risk in Alaska. As such, fishers should remain mindful of the potential for developing PSP after

Figure 2. Reported PSP Incidents — Alaska, 1993–2021



consuming recreationally-harvested shellfish year-round. All suspected PSP cases should be reported to the Alaska SOE. The Alaska Department of Environmental Conservation routinely tests commercially-harvested shellfish to determine saxitoxin levels; therefore, commercial shellfish are safe to consume.

Saxitoxins block sodium ion channels, leading to rapid onset and progression of neurologic symptoms such as perioral tingling, ataxia, difficulty swallowing, dizziness, and paresthesias. Symptom onset ranges from several minutes to 4 hours after ingestion. Many milder cases of PSP likely go unreported due to the transient and non-specific nature of symptoms. More serious cases can rapidly progress from muscle weakness to paralysis, brainstem dysfunction, and respiratory failure. There is no anti-toxin for PSP. Treatment includes supportive measures that may include respiratory support such as mechanical ventilation for severe cases. Since saxitoxins cannot be destroyed by cooking or freezing, recreationally-harvested shellfish can still cause PSP even if consumed after being frozen and/or cooked.

Recommendations

1. Persons experiencing PSP symptoms shortly after consuming recreationally-harvested shellfish should seek immediate medical attention.
2. Clinicians must immediately report all suspect cases of PSP to SOE; call 907-269-8000 Mon-Fri 8AM–4:30PM, or 800-478-0084 after-hours.
3. Clinicians should promptly collect urine from suspected cases and store frozen. Contact SOE for instructions on routing specimens for saxitoxin testing. Collect implicated shellfish and consult with SOE for testing.

References

1. CDC. National Outbreak Reporting System Dashboard. Atlanta, Georgia: U.S. DHHS, Available from URL: www.cdc.gov/norsdashboard.
2. State of Alaska. *Epidemiology Bulletin*. “Paralytic Shellfish Poisoning — Alaska, 1993–2014”. No. 1, January 7, 2015. Available at: http://epi.alaska.gov/bulletins/docs/b2015_01.pdf
3. Harley JR, et al. The Southeast Alaska Tribal Ocean Research (SEATOR) Partnership: Addressing data gaps in harmful algal bloom monitoring and shellfish safety in Southeast Alaska. *Toxins* 2020; 12(6):407.

Figure 1. Reported PSP Cases (N=132) and Incidents (N=79) — Alaska, 1993–2021

