Outline

- Shellfish Poisoning Reporting in WA
- Biotoxin Monitoring Program in WA
- Outbreak Summary
- 2012 Updates
- Risk Communication
Previous Outbreaks of DSP

- U.S.
  - Illness reports in 1980’s on East Coast
    - No testing of implicated shellfish
  - 2008: Harvest area closures due to okadaic acid in TX Gulf coast oysters
    - No illnesses reported
Shellfish Toxin Reporting in WA

- Paralytic Shellfish Poisoning reportable since 1985
- Domoic Acid Shellfish Poisoning added in 2010
- Immediately notifiable
- DSP not yet reportable
- Captured under outbreaks of suspected foodborne origin
WA Monitoring Program

- WA Office of Shellfish and Water Protection (OSWP) – Marine Biotoxin Program & external partners

- Prior to 2010, routine monitoring of bivalve molluscs from commercial and recreational areas for amnesic (ASP) and paralytic shellfish poisoning (PSP) toxins

- 2010 Pilot study: 18 growing areas with historically high levels of Dinophysis algae monitored weekly

- 2011: Less funding results in fewer sites (6) monitored
  - Focus on areas with commercial production of mussels
Public Health Goals

- ID sources of major PH concern & prevent further transmission
- ID others with shared exposure - educate about symptoms to facilitate rapid diagnosis
- When risk to few individuals, inform them how they can reduce risk of future exposure
King County, WA Investigation
King County Investigation Notification & Investigation Methods

- **Case reports:**
  - Family harvested & consumed mussels last week in June
  - Sought information online - Contacted OSWP
  - Family referred to PHSKC Communicable Disease Epidemiology (CD Epi) section on July 8 for in-depth investigation.

- **Investigation methods:**
  - Family interviewed by phone and email
  - Harvest information shared with DOH CD Epi and OSWP
  - Shellfish from harvest area collected and tested for DSP toxins at FDA Gulf Coast Seafood Laboratory
King County Investigation
Harvest & Preparation Details

- Family camped at WA state park
- Harvested mussels from underside of public dock (mussels submerged in water)
- Mussels held in bucket with seawater for 2 hours
- Boiled for 10 minutes and consumed
- Family frequently harvests shellfish; first time at this location
King County Investigation
Case Findings

- Family of 4; all consumed mussels
  - 1 adult, 2 children (ages 2 and 5!) became ill
    - No underlying health conditions
  - Ills consumed 8 – 15 mussels each (vs. 4 consumed by non-ill)
- Median incubation: 7 hours (range 4-14 hr)
- Signs and symptoms: nausea, vomiting, cramps, diarrhea, subjective fever, chills, body aches
  - No neurological symptoms
  - No known secondary cases
- Median duration: 36 hours (range 15-96 hr)
- No one sought health care; no over-the-counter meds
King County Investigation
Laboratory Findings

- **OSWP**
  - Mussels sampled from implicated harvest area throughout summer
  - Testing performed at FDA laboratory
    - Liquid Chromatography-Mass Spectrometry (LC-MS) Analysis
      - Results: 10 mussel samples with toxin levels above regulatory threshold
      - Two collected prior to harvest date associated with illnesses
  - Range: 37.6 – 160.3 µg DSP toxin* / 100 g shellfish (ref. 16 µg / 100 g)

*Test for toxin “cocktail” including DTX-1, DTX-2, OA + acyl esters
Dinophysis Cell Counts and DSP Toxin Levels
King County Investigation
Public Health Actions

- Aug 8: Commercial and recreational closure of area around state park
  - Commercial product recalled back to Aug 1
- Aug 11: Press release issued on risk of DSP; educational information posted on Public Health website
- Warning signs posted at public beach
- Ongoing monitoring for illnesses consistent with DSP
- No additional reports of illness
- Commercial growing areas re-opened Sep 2
- Recreational harvest areas opened in late Oct
2012 Updates

- Partnership with NOAA Northwest Fisheries Science Center – monitoring through the summer
- 2012 summer: 13 sites with high levels DSP toxins
  - 8 recreational closures
  - 3 commercial closures
  - Peak level 184 µg DSP toxin/100 g shellfish
  - No illnesses reported
- WA PHL DSP testing operational Oct 2012
DANGER

TOXIC SHELLFISH
Shellfish in this area are unsafe to eat due to the biotoxin Diarrhetic Shellfish Poison (DSP).

DO NOT EAT clams, oysters, mussels, or scallops.

Always check the biotoxin hotline:
1-800-562-5632 or
www.doh.wa.gov/shellfisssafety.htm

For more information, contact:
360-236-3330
There's a public hearing in New York today about Mayor Bloomberg's proposal to limit portion sizes for sodas. What do you think about the idea?

**Hold The Ice: Rhetoric Gets Hot Over New York’s Big Soda Ban : NPR**

At a public hearing today, the opponents to New York Mayor Bloomberg’s

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Ever wonder who is keeping an eye on food prep in the restaurants you enjoy?

**Public Health Restaurant Inspector**

See how King County’s health inspectors keep an eye on the restaurants you enjoy. [http://www.kingcounty.gov/kctv](http://www.kingcounty.gov/kctv)

You can watch KCTV programs on Channel 22 on...

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Interesting online map illustrating the prevalence of HIV in the U.S., along with critical resources like testing and treatment center locations. You can also filter data by race/ethnicity, sex and age, to see how HIV prevalence is related to various social determinants of health like educational attainment and poverty.

**Map | AIDSVu.org**

[www.aidsvu.org](http://www.aidsvu.org)

AIDSVu is an interactive online map depicting the HIV epidemic in the U.S.

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Paralytic Shellfish Poison (PSP) has been detected at levels of concern in shellfish samples collected from King County beaches. As a result, the Washington State Department of Health has closed King County to the recreational harvest of shellfish.

**Emergency Closures Due to Marine Biotoxins**

[www.doh.wa.gov](http://www.doh.wa.gov)

The list of closed beaches that are closed due to marine biotoxin
All King County beaches closed to recreational shellfish harvesting

The state Health Department has closed all King County beaches to recreational shellfish harvesting after paralytic shellfish poison (PSP) has been found at levels of concern in shellfish samples on county beaches.

Advisory signs are going up at beaches to warn visitors not to collect any shellfish, according to Public Health – Seattle & King County officials.

The closure means you can’t harvest oysters, mussels, scallops, other species of mollusks and invertebrates such as the moon snail. Crabmeat isn’t known to contain the PSP toxin, but the guts can contain unsafe levels. To be on the safe side, the health officials say to thoroughly clean crab meat and toss the guts (“butter”). This closure doesn’t apply to shrimp.

The toxin is not destroyed by cooking or freezing.

Commercial beaches are checked separately and commercial products should be safe to eat.
Resources

- WA DOH Marine Biotoxin Program: [Webpage](http://www.doh.wa.gov/AboutUs/ProgramsandServices/EnvironmentalPublicHealth/ShellfishandWaterProtection/ShellfishProgram/Biotoxins.aspx)


- WA Shellfish Safety Hotline: 1-800-562-5632
Acknowledgements

- **WA**
  - Jerry Borchert, WA DOH OSWP
  - Kathryn MacDonald, WA DOH CD Epi
  - Harold Ruark, WA PHL
  - Alison Robertson, US FDA

- **BC**
  - Marsha Taylor, BCCDC
Questions?

WARNING
Toxic Shellfish

Shellfish from this area are unsafe to eat due to paralytic shellfish toxin. Do not eat clams, oysters, mussels or scallops.

Red Tide Hotline
1-800-562-5632
For information call 360-236-3330
TDD Relay Service
1-800-833-6389
Contact local Health Agency at:
Extras
Diarrhetic Shellfish Poisoning (DSP)*

- Mild gastrointestinal symptoms:
- Incubation: 30 minutes – 12 hours
- Duration: Up to 2 – 3 days
- Diagnosis: Clinical
  - Toxin identification in implicated food
- Sequelae: None

<table>
<thead>
<tr>
<th>Nausea</th>
<th>Vomiting</th>
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<tr>
<td>Diarrhea</td>
<td>Abdominal Pain</td>
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<td>Chills</td>
<td>Headache</td>
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<td>Fever</td>
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- Frequency of illnesses largely unknown:
  - mild illnesses (no healthcare)
  - misdiagnosis / under-diagnosis
  - under-reporting

*Source: FDA “Bad Bug Book”
DSP Cycle of Illness

- **Algae:** Dinoflagellates, *Dinophysis* species
  - **Toxins:** Okadaic acid (OA), DTX-1, 2 and 3
  - Produced by the algae
  - Heat stable (not destroyed by cooking)
  - **Shellfish:** Mussels, oysters, scallops, clams
    - Feed on the algae, and concentrate the toxins
    - **People** eat the contaminated shellfish

Source of Dinophysis photo, D. Anderson, Woods Hole Oceanographic Institute:
http://www.whoi.edu/website/redtide/home
Laboratory Testing-DSP

- Cannot detect toxin in clinical samples
- Methods for detecting toxins in shellfish
  - Traditional method: mouse bioassays
  - Current method:
    - Instrumental – liquid chromatography / mass spectrometry
    - Identifies each type of toxin in a sample in addition to amount of toxin present
    - Used in U.S. and Canada

Source, Northwest Fisheries Science Center: [www.nwfsc.noaa.gov](http://www.nwfsc.noaa.gov) & CFIA