

Neurotoxic Shellfish Poisoning

Seminar on Red Tides in North Florida: Ecology,
Impacts and Response Activities

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Marine Toxins - Definition

- Many naturally occurring, potentially hazardous chemicals exist in foods.
- Algal and microbial (scombrototoxin) toxins.
- Hazard is the capacity to produce injury under the circumstances of exposure.
 - Dose
 - Frequency of exposure
 - Relative toxicity of particular chemical

Foodborne Marine Toxins in Florida

- Scombroid Poisoning
- Ciguatera Poisoning
- Neurotoxic Shellfish Poisoning
- Saxitoxin – Paralytic Shellfish Poisoning

Toxic Shellfish Poisonings

- Amnesic (ASP) – in US: CA, OR, WA; also Canada
- Diarrheic (DSP) – mostly Europe, Japan, S. America
- Neurotoxic (NSP) – FL, TX, NC and Mexico
- Paralytic (PSP) – mostly in CA, OR, WA, AK, ME, MA

Summary of Shellfish Poisoning Types: NSP and PSP

Type of illness	Area of Occurrence	Incubation period	Symptoms	Toxin
NSP	In USA: mostly in Florida, Texas, and North Carolina. Also in Mexico	Few minutes-several hours	Tingling and numbness of lips, mouth, fingers, toes; diarrhea, sensory cold-hot reversal, dizziness, pupil dilation.	Brevetoxins
PSP	In USA: mostly in California, Oregon, Washington, Alaska, Maine, Massachusetts	30 minutes	Numbness in lips, mouth and face, tingling in fingers and toes; headache, dizziness, muscle weakness, nausea, vomiting, motor incoordination, paralysis, death	Saxitoxins, gonyautoxins, others.

Summary of Shellfish Poisoning Types: DSP and ASP

Type of illness	Area of Occurrence	Incubation period	Symptoms	Toxin
DSP	Mostly Europe, Japan, South America. Okadaic acid has also been found in Gulf of Mexico shellfish and causative species occur Gulf-wide	30 minutes – few hours	Vomiting, diarrhea, nausea, abdominal pain.	Okadaic acid, dinophysistoxins, other.
ASP	In USA: California, Oregon, Washington. Also, Canada. Domoic acid has been found in Gulf of Mexico shellfish and the causative species occur Gulf-wide.	A few hours to 24 hours.	Vomiting, muscle cramps, disorientation, short-term memory loss.	Domoic acid.

Neurotoxic Shellfish Poisoning

- **Symptoms:** tingling and numbness of lips, mouth, fingers, toes; diarrhea, sensory hot-cold reversal, dizziness, pupil dilation
- **Onset:** few minutes to several hours
- **Duration:** mild symptoms resolve quickly and completely
- **Source:** shellfish contamination by brevetoxins (clams, scallops, mussels, oysters)
- **National occurrence:** Unknown, thought to be frequently misdiagnosed and unreported



Florida: 1.4 cases per year

Number of Reported NSP Outbreaks, Florida, 1994-2005

Year	County	# Cases	Vehicle
1994	Pinellas	1	Scallops
1995	Lee	2	Clams
1995	Lee	2	Mussels
1996	Sarasota	3	Whelks
1996	Pinellas	1	Scallops
2001	Sarasota	2	Oysters
2005	Charlotte	4	Clams

NSP Outbreak, Sarasota, 1996



- Recreationally harvested whelks and clams
- Sarasota Bay had been conditionally closed to harvest due to red tide 1/31-6/8/96; reclosed 6/11-6/28/96 due to rainfall
- 3 ill, 6/16/96: man and 2 yr. old son, 3 yr. old daughter
- Symptoms:
 - **Adult** - facial and perioral numbness, numbness in hands and feet
 - **Children** – abdominal cramping, shortness of breath, vomiting, seizures and unconsciousness in son
- Fa. treated and released, da. And son hospitalized and released 6/17 and 6/18 with no further symptoms

Reportable Diseases

- Rule 64D-3, Florida Administrative Code
 - NSP
 - Saxitoxin/PSP

Investigation



1. Clinical confirmation
2. Epidemiological interviews
3. Traceback of shellfish source

Epidemiological Investigation

- ✓ Date and time of shellfish consumption or other exposure
- ✓ Date and time of symptom onset
- ✓ Symptoms and duration
- ✓ Pre-existing conditions
- ✓ Date of hospitalization
- ✓ Date of death (where applicable)

Traceback Investigation

NSSP Model Ordinance for molluscan shellfish

- ✓ classifies dealer types and requirements
- ✓ shellfish tag information
 - dealer name and address
 - certification number
 - date of harvest
 - harvest location

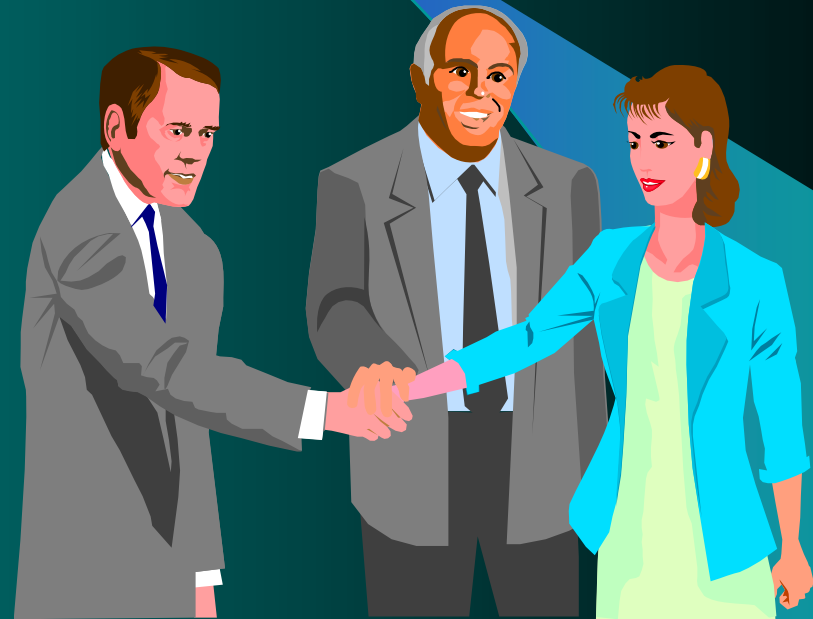
Barriers to Traceback of Shellfish



- ✓ Tags not kept by seller
- ✓ Invoices not kept by seller
- ✓ Numerous intermediate sellers
- ✓ No leftover shellfish available
- ✓ Recreational harvesting – no tags

Information Coordination: Reporting, Investigation & Research

- ✓ Between physicians, laboratories and health departments
- ✓ Between laboratories and health departments
- ✓ Between state agencies: DOH, DEP, FWC
- ✓ Between state and federal agencies: CDC, FDA



Educational Issues

- MDs/hospitals
 - Diagnosis
 - Reporting to CHDs
- Recreational harvesters
 - Difficult audience to reach
 - Local/tourist
 - Strategy? Encourage purchase from approved source