Poison Center Public Health Partnerships

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POISON Help™
1-800-222-1222

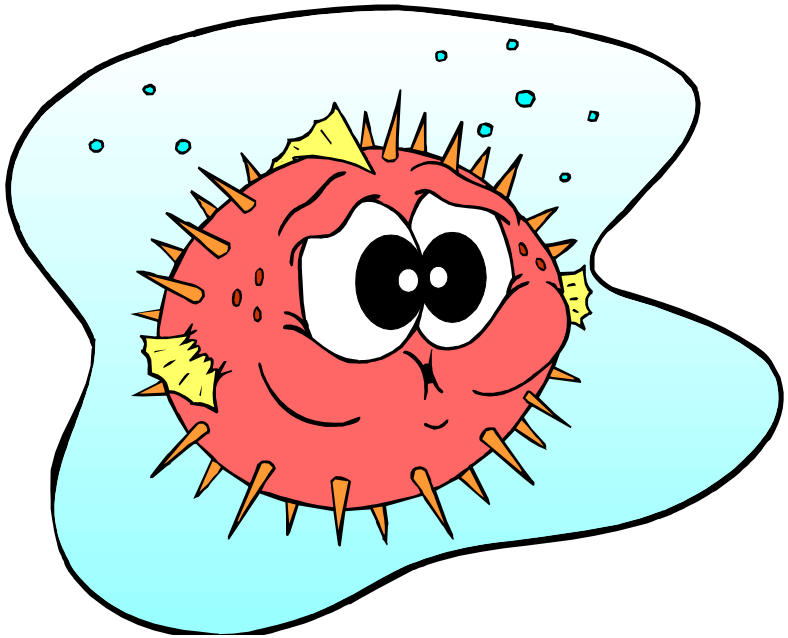
Objectives

- Describe the interaction of poison center services and public health
- Design a system to utilize poison center data for public health surveillance

Tales from the deep

March 18, 2002 a 69 year old man and his wife ate 6 pieces each of blow fish that his brother caught off of the Florida coast. Within 30 minutes the wife developed vomiting and complained of her lip and tongue tingling, the husband also complained of tingling around his mouth and arm.

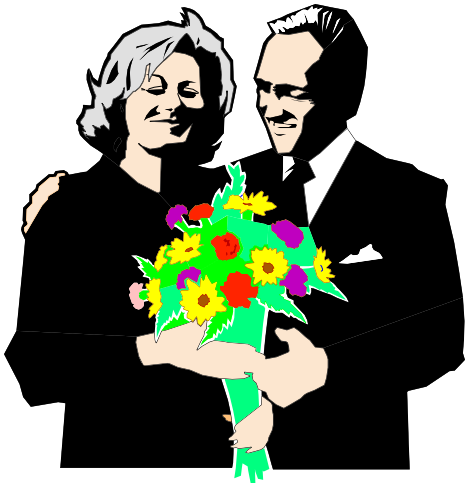
They were referred to a HCF. In the ED they both received 100 ml of 20% mannitol, The husband did well



The wife complained of tingling of her left arm, some chest discomfort, a tachycardia of 109, a BP 160/70 received mannitol and also received nitropaste.

She developed ascending weakness of her extremities and decreasing vital capacity. When her vital capacity dropped to 500 ml she was intubated and place on a ventilator

Within 48 hours her muscle tone return, she was extubated successfully. Her paresthesias completely disappeared.



Difficulty with diagnosis

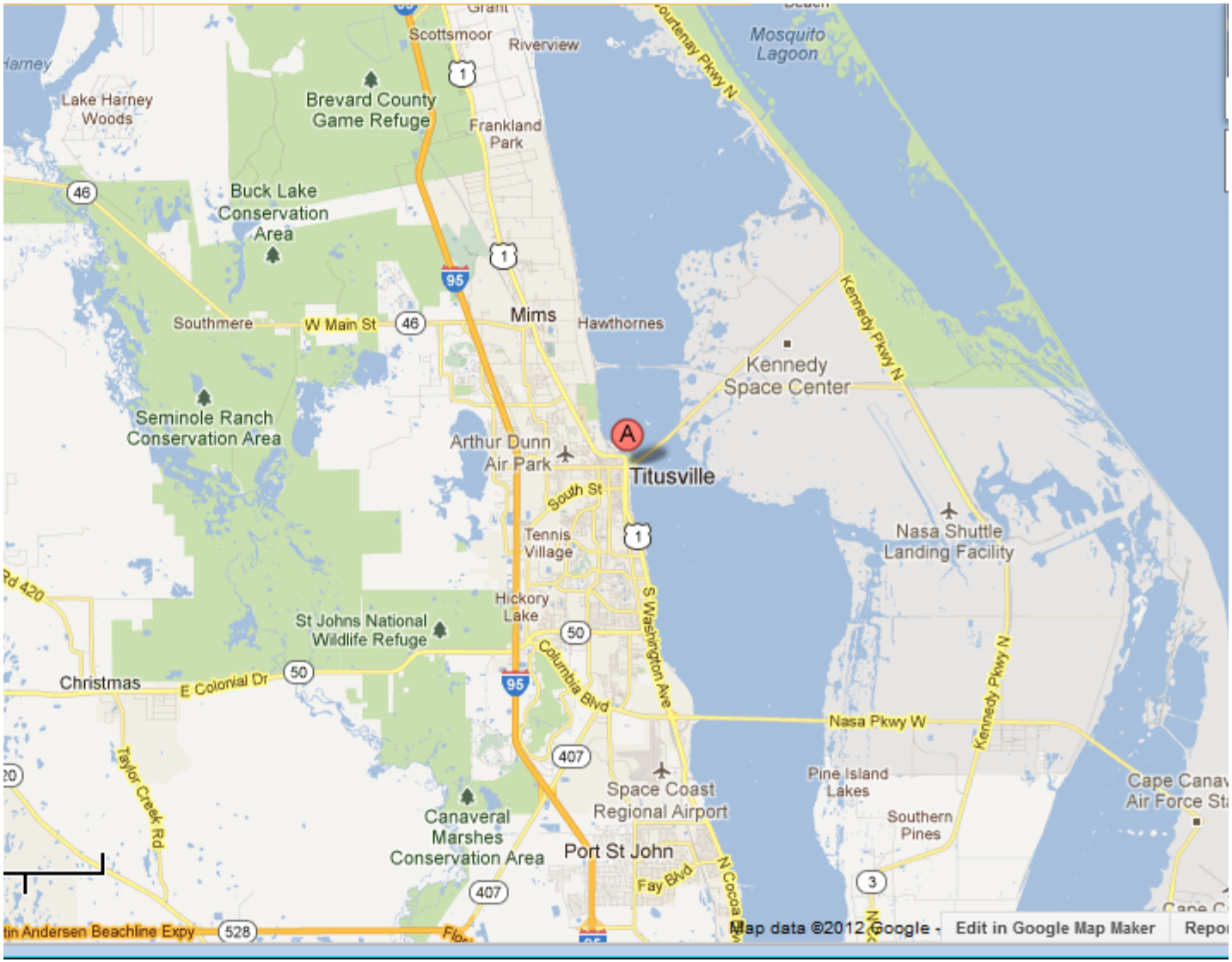
1. No prior reports of illness from east coast blowfish
2. Husband did not get the ascending paralysis

Epidemiology

- Brother caught the fish off of a pier in Titusville, Florida in late February 2002
  - He gutted, cleaned, filleted and froze the fish
- Brother dropped off frozen fish as he drove from Florida to NJ
- No one else ate the fish, no one sick

Epidemiology

- LHD embargoed the left over
- Tried to find someone to analyze the fish
- Asked AAPCC to look


Scottsmoor
Riverview
Mosquito Lagoon
Lake Harney Woods
Brevard County Game Refuge
Frankland Park
Buck Lake Conservation Area
Southmere
W Main St
Mims
Hawthornes
Kennedy Space Center
Seminole Ranch Conservation Area
Arthur Dunn Air Park
Titusville
South St
Tennis Village
Nasa Shuttle Landing Facility
Hickory Lake
St Johns National Wildlife Refuge
Christmas
E Colonial Dr
Columbia Blvd
Nasa Pkwy W
Pine Island Lakes
Space Coast Regional Airport
Canaveral Marshes Conservation Area
Port St John
Southern Pines
Fay Blvd
Map data ©2012 Google
Edit in Google Map Maker

Now what?

One month later

- 60 year old male presents to ER with neurological symptoms:
  - Dizzy
  - Parasthesias
  - Ataxia
  - Loss of LE coordination
- Claimed he ate blow fish!

More history

- Ate blowfish day before for breakfast
  - Had some dizziness
- Ate more blowfish for lunch
  - More dizzy and other symptoms developed
- No one else known to have eaten any

Fish was purchased

- Purchased from a local fish store in NJ
- Fish store purchased from its usual wholesaler
- Wholesaler acquired from NYC Fish Market
- NYC Fish Market acquired the fish from a crabber in Titusville Florida

LHD Obtained leftovers

- NJPIES called FDA, etc to seek analysis
- Researcher in Nova Scotia agreed to analyze

Review of reports to other Poison centers, etc

- Looked for cases of unexplained neurological illness, ventilated individuals without obvious reason to need such
- Identified 3 cases 1 in Florida in January, 2 (father and son) in Virginia 6 days before the NJ couple with neurological complaints, both ate fish from Titusville

Intensified Surveillance

- Established a case definition
- Alert to emergency rooms, county health departments, poison centers
- National alert and intensified surveillance

Case definition

- Consumption of Florida blowfish
- Tingling or numbness in the mouth and/or lips

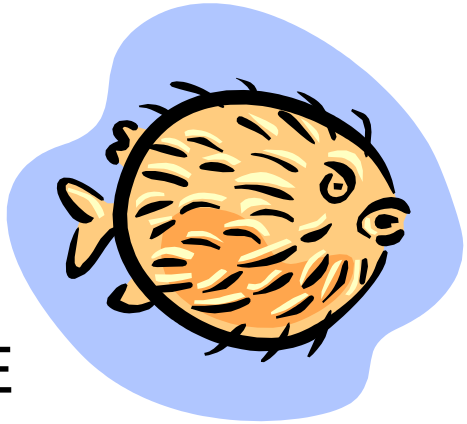
Florida specific surveillance 13 cases identified

- Florida poison center identified 9
- Hospital EDs and HD foodborne illness complaint logs 4 cases

Symptoms in Florida Cases

- Numbness in mouth/lips: 13
- Numbness of face: 8
- Numbness in arms: 10
- Numbness in legs: 7
- Numbness in fingertips: 1

History of fugu



1. Symbols in Egyptian tombs 2700 BCE
2. Deutoronomy 14:9-10 and Leviticus 11:10

   “These ye shall eat of all that are in the waters: all that have fins and scales shall ye eat; And whatsoever hath no fins and scales ye may not eat; it is unclean to you”
3. Medieval times, Tokugawa shogunate banned blowfish consumption

Current fugu consumption

1. Japan consumes >20,000 tons per year
2. New York City 1 ton per year
3. >1500 fugu restaurants in Japan
4. 1994 Ginza Sushiko, upscale Japanese restaurant opens in LA, charge $5,000 for a 7 year membership to have a fugu meal during the winter @$500.
5. 70-100 deaths a year

The law requires *fugu* chefs to be licensed to remove the poison entirely through a procedure called *migaki. Fugu* apprentices must undergo about 10 years of rigorous training and pass some tests to become full-fledged *fugu* chefs.

In November 2011, a two-star Michelin chef was suspended from his post at "Fugu Fukuji" restaurant in Tokyo. The chef served fugu liver to a female customer who (despite being warned of the risks) specifically asked that it be provided. The 35 year old customer subsequently required hospital treatment for mild symptoms of tetrodotoxin paralysis, but made a full recovery.

Current “folklore”

1. Zombies
2. Aphrodisiac
3. “Delicious”

Traditional Japanese Statement

Those who eat fugu soup are stupid.

But those who don’t eat fugu soup are also stupid!

Haiku by the poet Buson

I cannot see her tonight.

I have to give her up

So I will eat fugu

More Japanese Wisdom

Kitaoji Rosanjin, poet and gourmet:

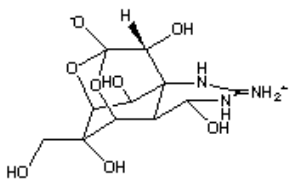
"The taste of fugu is incomparable. If you eat it three or four times, you are enslaved…Anyone who declines it for fear of death is really pitiable person!"

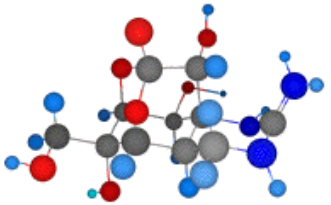
Kiichi Kitahara, owner of the Blowfish Museum in Osaka:

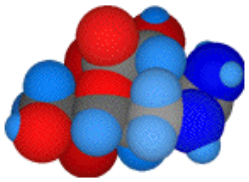
"Human beings are funny. They want to eat what is forbidden. The history of blowfish is the history of prohibition by authorities. If blowfish weren't poisonous, they might not be so popular."

Tetrodotoxin

1. Blocks the opening of the Na-channel
2. 1250X the toxicity of CN (estimated human lethal dose <1 mg!)
3. Conc. depends on species, geography, season, sex, tissue or organ
4. Heat stable

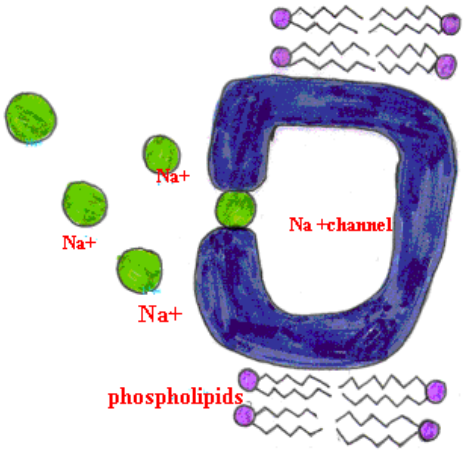






Tetrodotoxin Effect on Na-channel

1. Guanidinium moiety enters the voltage-gated sodium channel
2. Imidazole ring lodges in the opening of the channel leaving the rest of the molecule blocking its outer mouth
3. Shares a binding site with saxitoxin
4. Puffers have a mutation in the protein sequence of the Na-channel making the fish resistant therefore the toxin does not "recognize" the channel



Tetrodotoxin Production

1. Farmed fugu do not become toxic
2. Structurally similar to saxitoxin, know to be produced by marine micro-organisms
3. Evidence that vibrio bacteria produce the toxin found in both
    1. Blue ringed octupus which accumulates tetrodotoxin in its salivary gland
    2. Xanthid crabs

However! There is also evidence that the fish may produce!

Tetrodotoxin Poisoning

1. Conservative approach
2. Na? HCO_3?
3. Expect full recovery

Through the end of March 2012, Ai Japanese Restaurant and Lounge in Chicago offers fugu, Ai's Chef **Toyoji Hemmi** is the only ***licensed specialist*** serving fugu between New York and Colorado

Ai offers fugu four ways: *fugu usuzukuri,* sashimi style with citrus-laced ponzu sauce, $40; *nikogori,* fugu skin in savory gelatin, $8; *fugu nabe,* a Japanese hot pot also containing monkfish, noodles, mushrooms and vegetables, $40; and *hirezake,* fugu fin in hot sake, $7.
Reservations are required 48 hours in advance, with advance payment for the fugu portion of your order.

Institute for Marine Biosciences National Research Council, Canada

- Did not detect tetradotoxin
- Confirmed presence of saxitoxin and 2 analogs
  - Saxitoxin found at 20,000 mcg/kg tissue
    - Regulatory limit is 800!
    - Symptoms become severe >8000

Florida Testing of Native Fish

- Saxitoxin in toxic concentrations found in puffers in the Indian River in the area of Titusville Pier
- Lower levels found in South Banana River
- No saxitoxin found in mollusks

68B-3.007 **Prohibition on Take of Puffer Fish in Volusia, Brevard, Indian River, St. Lucie, and Martin Counties.**

In the waters of Volusia, Brevard, Indian River, St. Lucie, and Martin Counties, the taking of fish commonly known as puffers, Genus Sphoeroides, is prohibited.

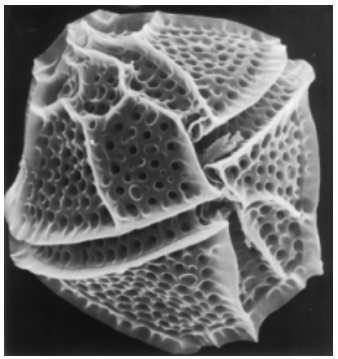
Specific Authority Art. IV, Sec. 9, Fla. Const. Law Implemented Art. IV, Sec. 9, Fla. Const. History–New 7-15-04.

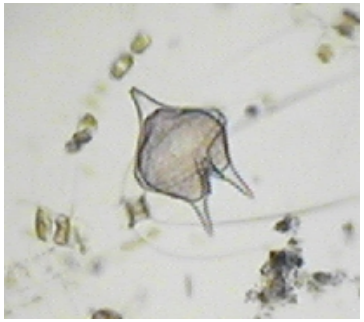
Still in place

No recent reports of illness

Saxitoxin

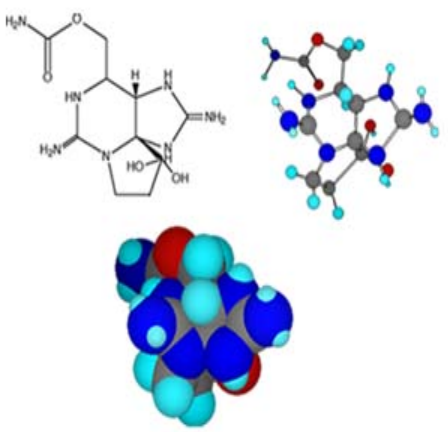
1. Putative agent in Paralytic shellfish poisonings
2. Heat and cold stable
3. Produced by dinoflagellate gymnodinium catenatum aka alexandrium
4. Accumulates in bivalve molluscs
5. Red tide





Saxitoxin
Effects similar to Tetradotoxin

- Guanidinium moeity blocks Na channel
- Oral LD50 mice 263 mcg/kg
  - Ingestion of >2 mg produce severe symptoms
  - Analyzed fish in this outbreak .100 g fish give tha dose
- Regulatory limit in shellfish



Paralytic Shellfish Poisoning

- Ingestion of mollusc
- Rapid peri-oral parasthesias progress centrifically to face, neck and beyond
- Heachache, dizziness, nausea, vomiting
- Often hypertension
- Supportive therapy

“Collaboration between poison control centers, local and state health departments, and federal agencies, including the FDA and Centers for Disease Control and Prevention, is essential to rapidly detect and respond to cases of foodborne toxin ingestion as well as other threats to the food supply”

Cohen et al. J Food Prot (2009) 72(4)810-817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My Last Tandoori Chicken

Index case

- 13 month old screened by pediatrician for lead as part of well baby exam
- Totally asymptomatic
- Lead level 57 mcg/dl
- Child admitted and chelated
- Home inspection by local health department found no obvious source of lead

- Post chelation lead was 22
- Repeat home visit: no source of lead
  - Visual
  - Dust Swipes negative

- Child still on breast milk

- Mother's blood lead 87 mcg/dl, FEP 150 mcg/dl
- Family is Indian Muslim, mother is a homemaker, father is a computer engineer
- Family has lived in various parts of US, mother was in India 4 months ago

- Father’s lead level was 95 mcg/dl
- No history of home repairs, use of ceramic pots, there was an Indian metal pot found in the home.

Powders found in the home

Found in the home

Purchased in a store

Product	Lead concentration (ppm)
Hot pepper powder	0.119
Coriander	0.390
Tumeric	1.457
Cumin	0.529
Jeera	0.563
Spice powder	0.148
Dosa powder	0.640
Sindoor	578,400

Sterling Silver Sindoor Container

Wedding Preparation