



# Ciguatera Fish Poisoning Outbreak Puerto Rico, 2018

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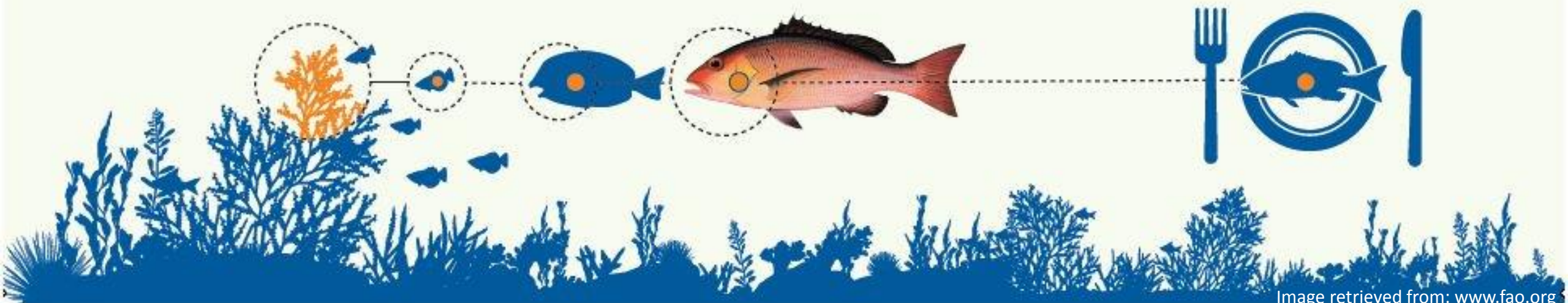
# Ciguatera Fish Poisoning

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- Most common food-borne illnesses related to seafood consumption
- Its true incidence remains unclear; it was estimated that 10,000–50,000 people per year suffer from this illness
- Caused by eating fish contaminated with ciguatoxins, a potent neurotoxin, produced by dinoflagellates such as *Gambierdiscus toxicus*

# How the ciguatoxin enters into the food chain and onto the plate

Both herbivorous and carnivorous fish can become toxic, because small fish ingest the toxin and then are eaten by larger fish, which are in turn consumed by humans.



# Ciguatera

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- According to the FAO (Food and Agricultural Organization of the United Nations) more than 400 species of fish are known to be vectors of ciguatera
- The fish that most commonly cause Ciguatera are barracuda, grouper, moray eel, amberjack, sea bass, sturgeon, parrot fish, surgeonfish, and red snapper.
- Ciguatera is endemic to tropical and subtropical areas specifically South Pacific and Caribbean. However, it is found worldwide anywhere fish are consumed



**Mero**  
(black grouper)



**Negrita**  
(blackfin snapper)



**Sierra**  
(king mackerel)



**Pámpano**  
(greater amberjack)



**Capitán**  
(hogfish)



**Jurel**  
(horse-eye jack)



**Cubera**  
(cubera snapper)



**Pargo**  
(dog snapper)



**Picúa**  
(barracuda)



**Mero Pinto**  
(yellowfin grouper)

# **Ciguatera Fish Poisoning Puerto Rico, 2018**

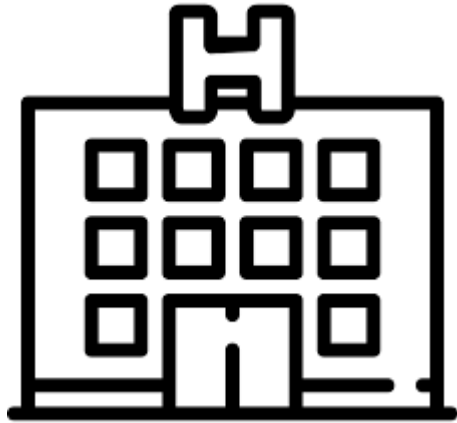
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**Outbreak Investigation**





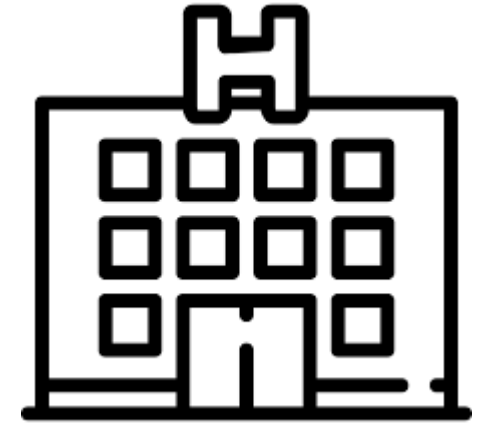
# Ciguatera Fish Poisoning: Case Notification



## HOSPITAL 1

- 2 suspected cases after “picúa” fish consumption
- 1 died
- 1 abandoned ER

Identified “friends”  
were in Hospital 1



## HOSPITAL 2

- 2 suspected cases after fish consumption
- 1 case hospitalized

October 24, 2018

# Ciguatera Fish Poisoning: Contact Tracing

## Interviews

- Fatal case family members
- New cases



## ID of:

- Fish source
- New cases
- Symptoms



**Five (5)  
cases ID'd  
at this  
point**



October 24, 2018



# Ciguatera Fish Poisoning: Investigation Process

## Interventions

- Environmental Health Investigations
- Leftover food acquisition
- Coordination with PRDOH Hygiene Lab
- Coordination with FDA for sample analysis

## Surveillance

- Daily follow up with reported patients and reporting hospitals
- Monitoring of foodborne illness at metro region hospitals and CDTs
  - **ID of 3 new cases**
    - 2 related to the outbreak
    - 1 not related to the first group

## Case Report

- Cases notification to:
  - Epidemiology Central level
  - Bayamón region Epi office
  - EH Bayamón region
  - Metro regional director
  - PRDOH Laboratory
  - FDA Laboratory

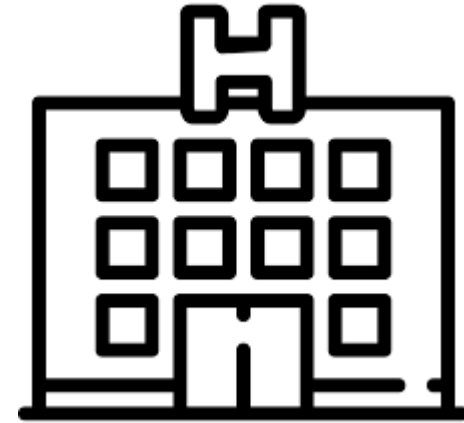
October 25-30, 2018

# Ciguatera Fish Poisoning: Investigation Process

## Surveillance

- Second patient dies
- Two patients already released from hospital need to be re-hospitalized

October 26, 2018



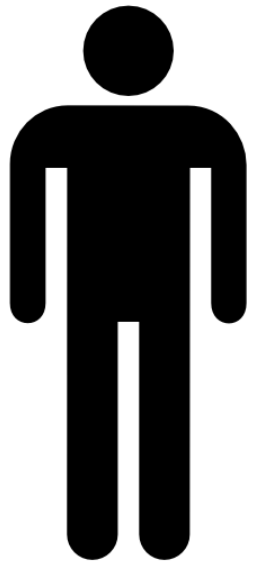
### HOSPITAL 3

- One (1) case of the same group
- Hospitalized

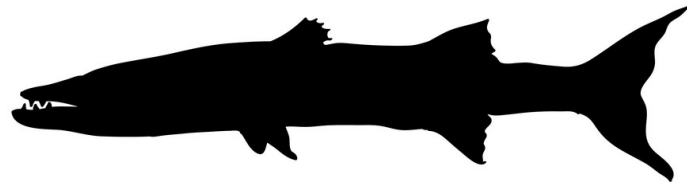
October 29, 2018

# Ciguatera Fish Poisoning: Chain of Events

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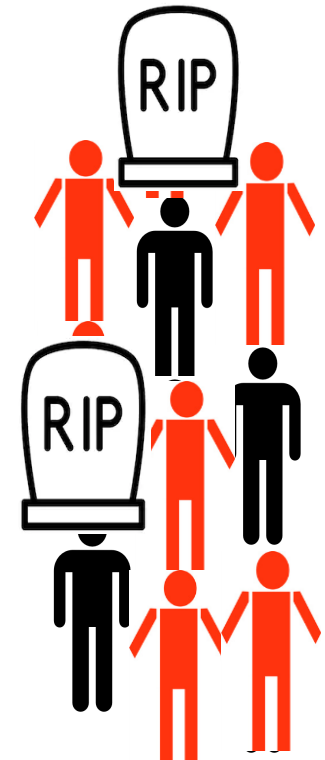
Patient 1



Barracuda  
(Picúa)



Neighbors House



- 7 People ate/ got sick
- 2 Died

# Ciguatera Fish Poisoning: Findings

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- **Eight (8)** people identified with ciguatera symptoms after eating fish from the same fish market
  - **7** from a group gathering that ate “Picúa” (Barracuda) fish that was prepared at home
  - **1** individual case who obtained “Cubirrubia” (Yellow tail snapper) at the fish market, prepared and ate it at home alone
    - Hospitalized

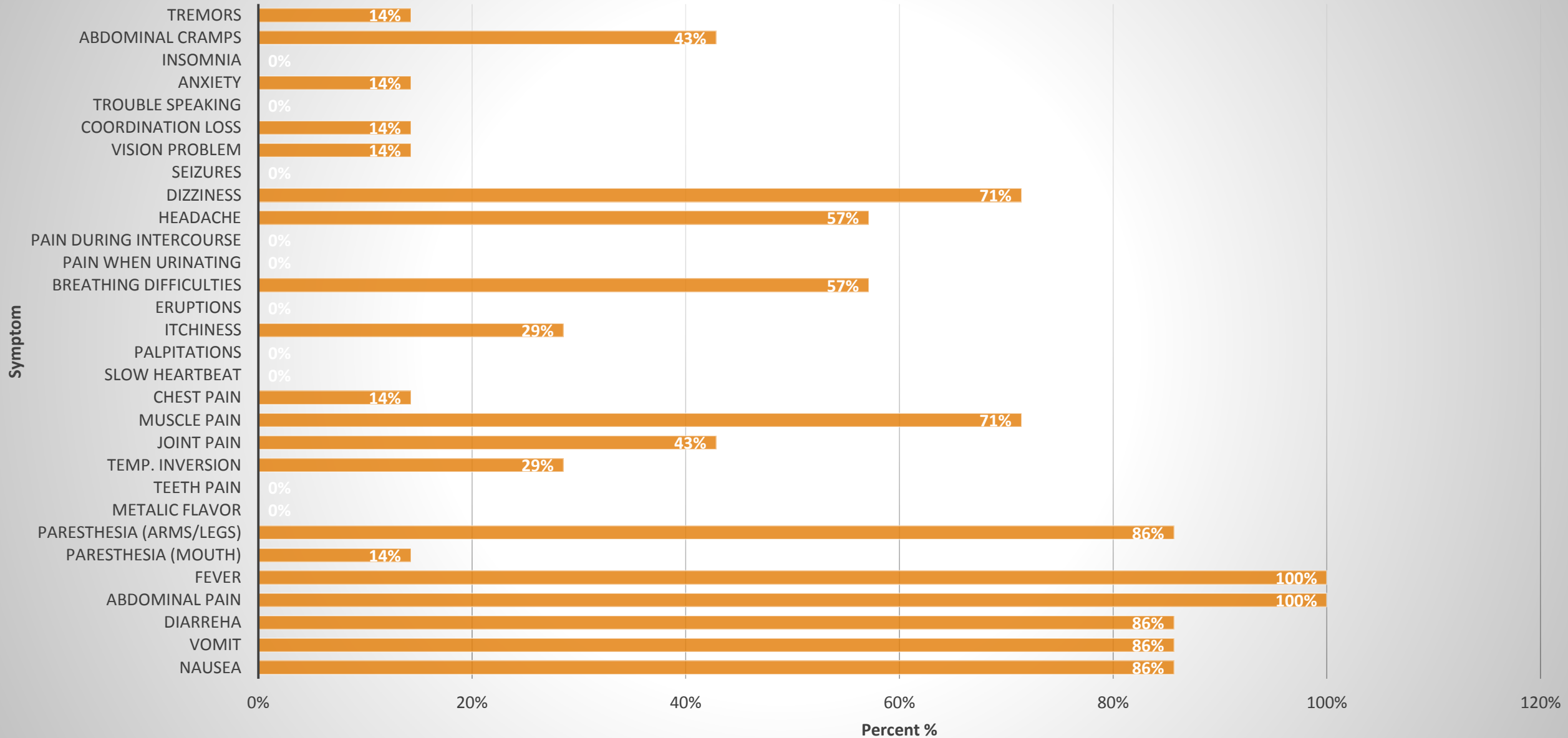
# Ciguatera Fish Poisoning: Findings

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## Group Gathering

- Deaths
  - Two (2) people died
  - 1 abandoned the ER
- Hospitalization
  - Five people (71%)
- One (1) used alternative medicine

# Symptoms Frequency. Ciguatera Fish Poisoning; Puerto Rico, 2018



# Ciguatera Fish Poisoning: Findings

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Fish Consumption



October 22, 2018

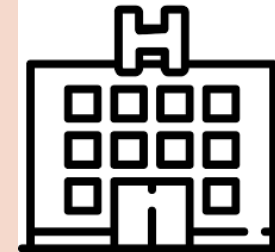
3 Hours



Onset

October 22-23, 2018

3-6 Hours



Hospital Visit



# Ciguatera Fish Poisoning: Findings

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## Food and Drug Administration (FDA) Laboratory Analysis

- Nine raw frozen portions were analyzed
- Cytotoxicity Assay and Liquid Chromatography-Mass Spectrometry were performed
- Samples tested:
  - Positive by the N2a cytotoxicity assay
  - Positive for Caribbean ciguatoxin-1 (C-CTX-1)
- Guidance Level: 0.1 ppb C-CTX-1 equivalents
  - Sample result: 14.6 ppb C-CTX-1

# Ciguatera Fish Poisoning: Findings

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## Environmental Health

- Fish Market inspections
  - Numerous irregularities
  - Tons of fish product seize
- Numerous findings at multiple visits
- Permanent closure of the establishment

# Ciguatera Fish Poisoning: Conclusions

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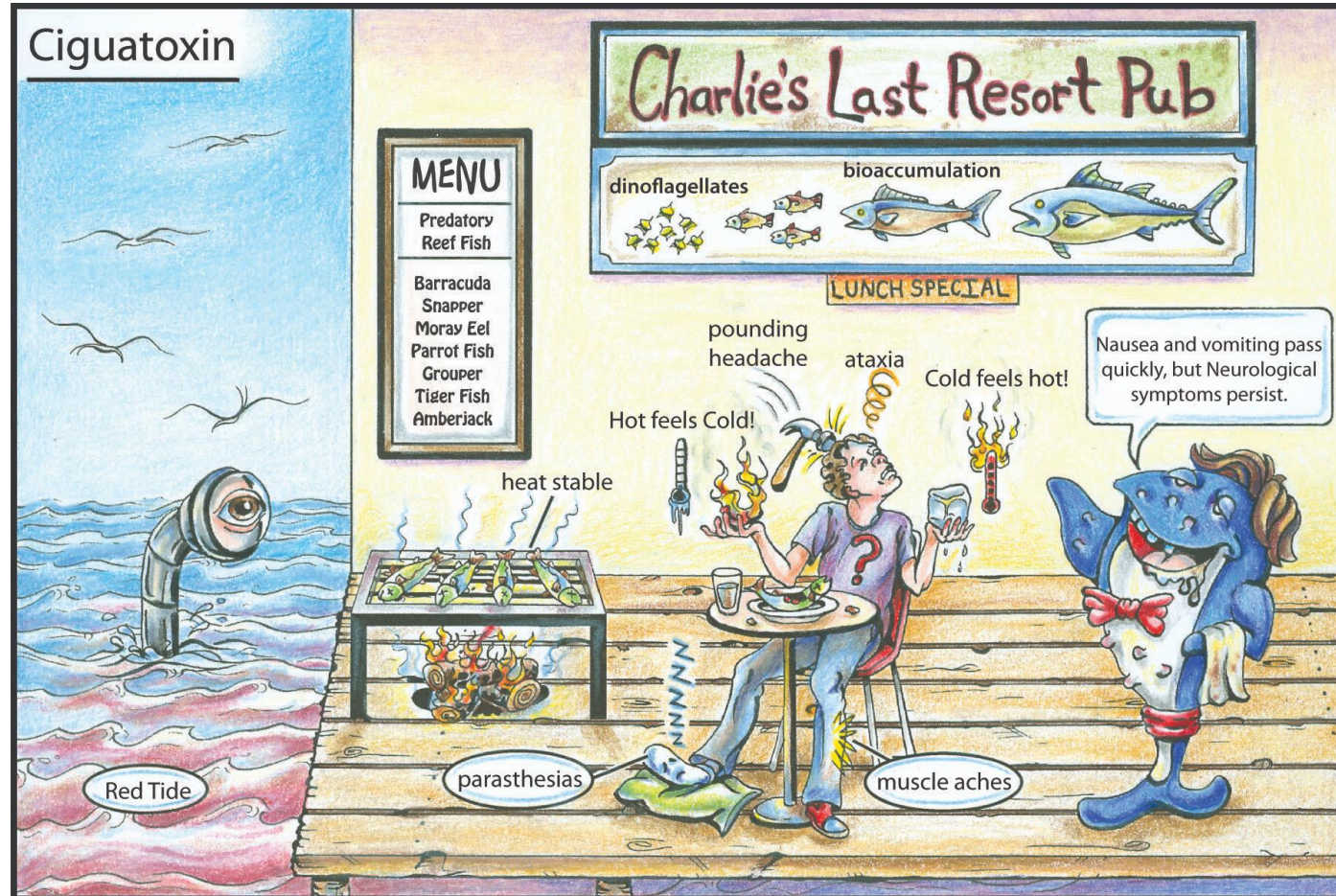
- Despite available information on different local outlets regarding ciguatera and the permitted fish species for consumption, we observed a need for increased education and awareness for fishermen, fish market owners and general public.
- It is important to be able to identify the epidemiology of ciguatera and the gastrointestinal and neurological symptoms associated with it in order to provide treatment in a timely manner.

# Acknowledgments

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- Office of Epidemiology and Investigation at PRDOH
- Metro and Bayamón Region Environmental Health Offices
- Infection Control Personnel of:
  - Doctors Center San Juan- Libeliz Campis
  - Hospital Municipal de San Juan- Eneida Gomez
  - Hospital Pavía Santurce- Silvia Miralles
- Food and Drug Administration (FDA) Laboratory Personnel
- Biosafety Office- Melissa Bello and Igor Uriz

# Questions?



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