

EuroCigua



# SURVEILLANCE PROTOCOL FOR CIGUATERA FOOD POISONING IN THE EU

2017

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## Foreword

According to Decision No 1082/2013/EU, epidemiological surveillance means the systematic collection, recording, analysis, interpretation and dissemination of data and analysis on communicable diseases and related special health issues.

Pursuant to Decision No 2119/98/EC of the European Parliament and of the Council a network for the epidemiological surveillance and control of communicable diseases in the Community was set up. The network shall be operated and coordinated by the European Centre for Disease Prevention and Control (ECDC). The Member States (MS) should communicate comparable data of a list of communicable diseases, according to established case definitions. Ciguatera food poisoning (CFP) is not included in this list. However the reporting of investigated food-borne outbreaks has been mandatory for the European Union (EU) MS since 2003. The zoonoses directive 2003/99/EC states that Member States' Competent Authorities shall investigate food-borne outbreaks and transmit to the European Commission every year a summary report of the results of the investigations carried out. Based on an agreement with the European Commission, CFP outbreaks data must annually be reported to the European Food Safety Authority (EFSA).

The EFSA, through a Framework Partnership Agreement (FPA), supports a multiannual and multinational project to understand better the issue of ciguatoxin intoxication as a possible emerging risk in the EU. The project will estimate the incidence of ciguatera in Europe and determine the epidemiological characteristics of cases; will assess the presence of ciguatoxin in food and the environment in Europe and will develop and validate methods for the detection, quantification and confirmation of the presence of ciguatoxin contaminated specimens.

[http://www.aecosan.msssi.gob.es/AECOSAN/web/ciguatera/seccion/the\\_project.htm](http://www.aecosan.msssi.gob.es/AECOSAN/web/ciguatera/seccion/the_project.htm)

## Scope and purpose

This protocol is a guide for EU MS and European Economic Area (EEA) countries in order to carry out retrospective and prospective surveillance of CFP in the EU/EEA<sup>1</sup> from 2012 to 2019 in a harmonized manner and on a voluntary basis for the duration of the FPA. The purpose of the surveillance is to estimate the incidence of CFP and characterize the epidemiological pattern of the disease in the EU/EEA.

The protocol is addressed to public health authorities dealing with epidemiological surveillance. The protocol will provide information on the disease, the reporting requirements and recommended public health measures. Public health authorities may consider disseminating the information to the health care system in order to raise awareness among health care professionals. This protocol is not intended to be a guide for outbreak investigation. Responsibility on outbreak investigation and measures implementation fall on the MS.

## Disease Description

### Introduction

CFP is a clinical syndrome caused by eating fish contaminated with ciguatoxins (CTXs). The number of people suffering of the disease annually was estimated from 10,000-50,000 to 50.000-500.000 individuals, but true incidence is difficult to know due to under ascertainment and under reporting. Ciguatoxic fish are usually distributed between latitudes 35° north and 35° south, mainly in the Caribbean, Indo-Pacific islands and the Indian Ocean. Occasionally, CFP has been reported outside endemic areas, such as the Bahamas, Canada or Chile. In Europe, autochthonous ciguatera food poisoning outbreaks have been

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<sup>1</sup> Tropical overseas territories are excluded.

reported in Spain (Canary Islands) and in Portugal (Madeira). Cases of CFP may also occur in non-endemic regions because of increasing consumption of imported contaminated fish.

## Symptoms

CFP patients may have gastrointestinal, neurological and cardiovascular symptoms. Symptoms presentation varies according to the individual characteristics and the geographical origin of the CTXs. Gastrointestinal symptoms precede or accompany the neurological symptoms. Neurologic symptoms usually appear three to 48 hours after eating the contaminated fish. Symptoms reported may include: nausea, vomiting, diarrhoea, abdominal cramps, paraesthesia of lips, tongue and extremities, cold allodynia (burning pain caused by a normally innocuous cold stimulus), a metallic taste, arthralgia, myalgia, pruritus without urticarial or erythema, muscle weakness, blurred vision, hypotension and bradycardia. Cold allodynia is considered characteristic of CFP, although it is not suffered by all patients; consumption of shellfish contaminated with brevetoxin may also produce allodynia. Neurological symptoms usually resolve in weeks, although some symptoms can last months. Recurrent symptoms may occur following the ingestion of food or beverages, mainly: alcohol, nuts or non-toxic fish. CFP is rarely fatal. However, death may occur in severe cases due to severe dehydration, cardiovascular shock or respiratory failure.

## Agent

CTXs are lipid-soluble, heat-stable and acid-resistance neurotoxins. CTXs activate the voltage-dependent sodium channels in cell membranes, which increases sodium ion permeability and depolarizes the nerve cell. They are classified as Pacific, Caribbean and Indian Ocean CTXs.

CTXs are produced by dinoflagellates of the genus *Gambierdiscus* that grow on and around reefs. Accumulation of CTXs in the marine food chain results from the ingestion of toxin-producing dinoflagellates by herbivorous fish, which are in turn preyed upon by larger carnivorous fish. The toxins are metabolised to more toxic forms as they move up the food chain. CTXs accumulate in higher concentrations in the fish head or organs (eg., liver or gonads).

## Reservoirs

Over 400 known fish species from tropical and subtropical waters have been classified as potential CTXs carriers. Examples of the fish most frequently associated with ciguatera cases include: barracuda, grouper, amberjack, red snapper, moray eel, hogfish, mackerel, surgeonfish, and parrotfish.

## Modes of transmission

CFP is due to the consumption of fish contaminated with CTXs. Person to person transmission of CTX is extremely rare, but transmission from mother to child during breastfeeding or across the placenta and sexual transmission have been described.

## Incubation period

The incubation period goes from 2 to 48 hours.

## Period of communicability

The period of communicability from mother to child or through sexual transmission is unknown.

## Laboratory testing for fish

Laboratory testing to detect CTXs in clinical samples is not currently available, so that detection of CTXs is done in the fish. Fish should be kept frozen at -20°C. This includes fish meal remnants. Fish samples should be double-bagged and securely sealed. In vitro cytotoxicity and receptor binding assays provide sufficient detection capability and they can detect all active toxin analogues. Although these assays do not

provide information on toxin profiles, they could be applied as screening methods for CTXs. Liquid chromatography-tandem mass spectrometry (LC-MS/MS) methods allow specific detection of individual analogues of Pacific, Caribbean and Indian Ocean CTXs and they may provide CTXs quantification in fish extracts. None of the current methods of analysis to determine CTXs in fish has been formally validated.

If any country does not have the lab capacity for detection of CTXs during the investigation of a ciguatera case or outbreak, testing of fish samples maybe possible for research purposes within the project. The feasibility of the request would be assessed case by case contacting the email: [ciguatoxinas@msssi.es](mailto:ciguatoxinas@msssi.es)

## Disease Reporting

### Objective

1. To characterize the epidemiological pattern of ciguatera food poisoning in the EU/EEA.

### Case definition

#### Clinical Criteria

Any person having neurologic symptoms, if other causes have been excluded. Most frequent symptoms are: paraesthesia, cold allodynia, dysesthesia, pruritus without urticarial or erythema, diffuses pain and muscle weakness.

Gastrointestinal symptoms (nausea, vomiting, and diarrhoea) often precede or accompany the neurological symptoms. Cardiovascular symptoms and signs (hypotension and bradycardia) may also be present.

#### Diagnostic Criteria

- A history of consumption of ciguatoxin-confirmed fish in the two days before disease onset
- Fulfilling clinical criteria

#### Epidemiological Criteria

At least one of the following two epidemiological links in the two days before disease onset:

- Exposure to fish (species, common name or type) previously associated with ciguatera (e.g., moray eel, amberjack, barracuda, red snapper, or grouper) (Annex 1)<sup>2</sup>
- Exposure to a same common source as a confirmed human case.

#### Case Classification

##### A. *Possible case*

Any person meeting the clinical criteria after consuming fish (species, common name or type) either NOT previously associated with ciguatera or of unknown type.

##### B. *Probable case*

Any person meeting the clinical and the epidemiological criteria

##### C. *Confirmed case*

Any person meeting the diagnostic criteria

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<sup>2</sup> It is an incomplete list. It can be updated.

## Other definitions

### Outbreak definition

Two or more cases with an epidemiological link.

### Case/outbreak associated with consumption of autochthonous fish

Case or outbreak associated with consumption of a fish harvested within the EU/EEA<sup>3</sup>.

### Case/outbreak associated with consumption of imported fish

Case or outbreak associated with consumption of a fish harvested outside the EU/EEA<sup>3</sup>.

### Travel associated case/outbreak

Case/outbreak associated with consumption of fish in a tropical endemic area.

## Reporting flow

The National Centre of Epidemiology (CNE), belonging to the Spanish Public Health Institute and leader of the epidemiological part of the EuroCigua project, will collate and analyse the data on CFP cases and outbreaks received from the MSs that voluntarily agree to participate in the collection of CFP cases and outbreaks. Specific questionnaires (Annex 2 and 3) have been prepared to collect homogenous information. Every case, including outbreak related cases, should be reported through the case report form (Annex 2).

Moreover the CNE will collect information on ciguatera cases and outbreaks from any other available source.

## Legal reporting requirements

According to the zoonoses directive 2003/99/EC, competent authorities shall investigate food-borne outbreaks and transmit to the Commission (on the basis of an agreement between EFSA and the EC, this data is notified and reported in an electronic reporting system and a database managed by EFSA) a summary report of the results of the investigations carried out. Requirements for the summary reports to be submitted by the Member States' competent authorities pursuant to Article 9 (1) of that directive are;

- (a) total number of outbreaks over a year;
- (b) number of human deaths and illnesses in these outbreaks;
- (c) the causative agents of the outbreaks, including, where possible, serotype or other definitive description of the agents. Where the identification of the causative agent is not possible, the reason for such unidentifiability should be stated
- (d) foodstuffs implicated in the outbreak and other potential vehicles;
- (e) identification of the type of place where the foodstuff incriminated was produced/purchased/acquired/consumed;
- (f) contributory factors, for example, deficiencies in food processing hygiene.

Guidance for the reporting of annual food-borne outbreaks monitoring data can be found on the EFSA website.

Decision No 1082/2013/EU on serious cross-border threats to health mention that national competent authorities or the Commission shall notify an alert when the event is unusual or unexpected, it affects or

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<sup>3</sup> Tropical overseas territories are excluded.

may affect more than one Member State, and it requires or may require a coordinated response at Union level.

Each State Party shall notify World Health Organization of all events which may constitute a public health emergency of international concern within its territory, according to International Health Regulations.

CFP cases may be reported to the competent authorities in some countries or regions within the EU/EEA. In the Canary Islands (Spain) reporting of CFP from health care practitioners is mandatory.

## **Public Health Measures**

### **Preventive measures**

Avoiding consuming large predatory reef fish from affected areas could help preventing CFP. Greater illness severity is associated with eating the fish head or organs. Thus, it is also advisable to avoid consuming fish head and offal. CTXs are heat-stable toxins and cooking or freezing of the fish will not destroy them. Moreover CTXs are odourless and tasteless and toxic fish cannot be identified by appearance or behaviour.

Travellers to affected areas should receive educational information about symptoms, transmission mode and prevention and control measures.

Since CFP may be transmitted through breastfeeding and unprotected sexual intercourse, advised on refrain from breastfeeding and sexual intercourse (unprotected) while patient is symptomatic should be considered.

### **Measures for single cases**

#### Cases

Patient should complete a questionnaire including a two days food-history (Annex 2). Samples of the suspected fish or meal should be collected for CTXs testing. Identification and removal of the toxic fish to prevent further cases it is a priority. Information about the fish should be obtained, if possible.

Inform patient that ingestion of some substances (mainly alcohol, fish and nuts) may cause recurrent CFP symptoms.

#### Treatment

There is no specific treatment: symptomatic and supportive treatments may be necessary.

Intravenous mannitol infusion is the most studied therapy for CFP. It is suggested that it should be given within 48-72 hours of eating the toxic fish, although beneficial effects have been observed even up to several weeks after onset of symptoms. The results of a double-blind randomized study of mannitol treatment indicate that mannitol and normal saline were associated with clinical improvement and mannitol was not superior to saline. Hazards of mannitol treatment include loss of further fluids in patients suffering from acute diarrhoea and vomiting and that patients experiencing bradycardia and hypotension are at higher risk of cardiac failure if infused with high doses of mannitol.

### **Measures for outbreaks**

Any case of CFP should be investigated as a possible outbreak. For outbreaks (two or more cases with an epidemiological link) an outbreak questionnaire should be completed (Annex 3).

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