Eurosurveillance
Europe's journal on infectious disease epidemiology, prevention and control

Vol. 17 | Weekly issue 23 | 7 June 2012

Rapid communications

News

ecdc EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

www.eurosurveillance.org

Outbreak of ciguatera food poisoning by consumption of amberjack (*Seriola* spp.) in the Canary Islands, May 2012

D Nuñez (dnungal@gobiernodecanarias.org)[1], P Matute[1], A Garcia[1], P Garcia[1], N Abadía[1]
1. Servicio de Epidemiología y Prevención, Dirección General de Salud Pública, Servicio Canario de la Salud, Canary Islands, Spain

Citation style for this article:
Nuñez D, Matute P, Garcia A, Garcia P, Abadía N. Outbreak of ciguatera food poisoning by consumption of amberjack (Seriola spp.) in the Canary Islands, May 2012. Euro Surveill. 2012;17(23):pii=20188. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20188

Article submitted on 18 May 2012 / published on 7 June 2012

In May 2012 a family outbreak of ciguatera food poisoning, affecting four people, was detected in Tenerife, Canary Islands. The outbreak was caused by eating amberjack fish (*Seriola* spp.) bought in a local market. This is the third outbreak of ciguatera food poisoning in the Canary Islands in 2012. We describe the epidemiology of this outbreak.

Outbreak description

In mid-May 2012, a primary healthcare centre in Tenerife reported a case compatible with ciguatera food poisoning, according to the criteria established by the Epidemiological Surveillance System for Ciguatera poisoning in the Canary Islands (SVEICC) [1]. The next day, another primary healthcare centre located in a different town notified a second compatible case. The second case belonged to the same family as the index case. An investigation was initiated, and two more cases were subsequently found, also with symptoms consistent with ciguatera poisoning. The four cases consisted of a man and three women, aged in their mid-30s to early 60s. The symptoms presented by the cases are detailed in Table 1. Although three cases were treated, none required hospitalisation.

Food investigation

Questioning cases about their food history revealed that all had shared a common meal. The onset of symptoms had occurred between five and 36 hours after ingestion of a food item served during this meal.

The food eaten by all cases was made with fish of the species amberjack (*Seriola* spp.), which had been bought two months earlier in a local market, and frozen until the date of consumption. It was a 2 kg piece of fish, the origin of which is currently being sought. The only remains of the consumed meal was a soup made with the fish in question, which is being analysed to confirm the presence of ciguatoxin, the toxin responsible for ciguatera poisoning.

TABLE 1

Symptoms of cases with ciguatera food poisoning, Canary Islands, Spain, May 2012 (n=4)

Symptom	Presence (+) or absence (-) of symptom in cases			
	Case 1	Case 2	Case 3	Case 4
Vomiting	+	-	-	-
Diarrhoea	+	+	+	+
Nausea	+	+	+	-
Abdominal pain	+	+	-	-
Tingling lips, hands and legs	+	+	-	+
Paradoxical thermal sensation	+	-	-	+
Pruritus	+	+	+	+
Fatigue	+	+	+	-
Myalgia	+	+	+	+
Swelling eyelids and hands	+	-	-	-
Cramps	-	+	-	-
Dizziness	-	-	-	+

Background

Ciguatera is a type of food poisoning caused by eating fish contaminated with ciguatoxin. Typically the implicated fish are large predator species that have accumulated toxin provided by herbivore fish that feed on algae and toxic dinoflagellates found on coral reefs (e.g. *Gambierdiscus toxicus*). The toxin is concentrated through the food chain, ultimately reaching the human consumer. Larger and older fish are often more toxic [2]. People who have ciguatera may experience nausea, vomiting, and neurologic symptoms such as tingling fingers or toes; they also may find that cold things feel hot and hot things feel cold. Onset usually occurs within 10 minutes to 24 hours after ingestion of toxic fish. Symptoms usually go away in days or weeks but can last for years. People who have ciguatera can be treated for their symptoms. Ciguatera has no cure [3].

Situation in Europe

In Europe, there have been reports of ciguatera poisoning related to travel to endemic countries boarding the Caribbean Sea or the Red Sea [2]. No indigenous cases have been reported in Spain but an outbreak occurred in 2004 associated with consumption of amberjack fish (*Seriola* spp.) captured in Canarian waters [4]. In 2008, an outbreak of ciguatera in Madeira, Portugal, was reported, due to consumption of amberjack fish caught in local waters [5]. Furthermore, some studies have identified the presence of *Gambierdiscus* spp. in waters surrounding the Canary Islands and Madeira [6], but there are still many gaps in knowledge regarding their prevalence, how long they have been present, the type(s) of toxin they produce, and the accumulation of toxins in the surrounding marine life [7].

An autochthonous outbreak of ciguatera food poisoning occurred in the Canary Islands in 2008 and was associated with consumption of fish purchased in the local market [8,9].

Surveillance initiatives in the Canary Islands

Following this second outbreak which affected 25 people, the SVEICC was launched in 2009. The SVEICC is based on urgent and compulsory notification of all cases that are treated in the healthcare system with symptoms consistent with ciguatera (suspected cases), and the collection of basic data on a case-specific epidemiological questionnaire. The 'suspected case' definition includes a history of consuming fish from any of the varieties considered at risk (amberjack, abbot, grouper, silverside, barracuda, moray eel, wahoo and Atlantic bonito) and the presence of clinical symptoms. Both the SVEICC and the specific epidemiological questionnaire are available on the Canary Islands Health Service website [1].

The food research done for each case of suspected ciguatera poisoning includes information on the date and place of capture of fish, their origin, weight and size, and place of distribution or sale. It also gives priority to location and collection of a sample of the product consumed (for laboratory confirmation) and the destruction of the remains of involved fish to avoid its consumption.

Epidemiological surveillance results

In addition to the most recent outbreak reported here, the SVEICC recorded eight indigenous outbreaks of ciguatera food poisoning between November 2008 and April 2012, according to data from the Epidemiology and Prevention Service of de General Directorate of Public Health. The total number of people who have been affected up to now is 68. The following table contains information broken down for each of the outbreaks: date of onset, number of cases, species of fish associated with the outbreak, weight and their origin.

In three of the outbreaks, presence of ciguatoxin in the food eaten was confirmed.

TABLE 2

Outbreaks (n=9) and number of cases (n=68) of ciguatera food poisoning, Canary Islands, Spain 2008–2012

Outbreak number	Date	Island	Number of human cases	Fish species	Weigth (kg)	Origin
1	15/11/2008	Tenerife	25	Amberjack (*Seriola fasciata*)	37	Local market
2	29/01/2009	Tenerife	4	Amberjack (*Seriola dumerilis*)	67	Sport fishing
3	03/09/2009	Gran Canaria	3	Amberjack (*Seriola* spp.)	Unknown	Unknown
4	19/11/2009	Tenerife	2	Amberjack (*Seriola* spp.)	Unknown	Sport fishing
5	24/04/2010	Tenerife	6	Amberjack (*Seriola* spp.)	80	Unknown
6	26/06/2011	Gran Canaria	5	Amberjack (*Seriola* spp.)	24	Sport fishing
7	28/01/2012	Lanzarote	10	Amberjack (*Seriola* spp.)	15	Sport fishing
8	04/04/2012	Lanzarote	9	Amberjack (*Seriola* spp.)	26	Sport fishing
9	05/2012	Tenerife	4	Amberjack (*Seriola* spp.)	Unknown	Local market

Conclusions

Epidemiological surveillance activities indicate that ciguatera food poisoning occurs in the Canary Islands. All documented outbreaks since 2004 have been associated with the consumption of large amberjack. To date, no other species has been identified in relation to outbreaks. Most of the outbreaks are linked to sport fishing activities.

Ciguatera poisoning is an emergent process in the Canary Islands, with a persistent incidence of outbreaks and an impact on public health. However, the number of cases remains lower than an average of 12 cases per year, so the risk of contracting the disease in the Canary Islands is very low. Moreover there are still many unknowns regarding the origin of the problem and the real meaning of the presence of *Gambierdiscus* spp. (producers of ciguatoxin) [5-7] in our marine environment.

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Imported laryngeal and cutaneous diphtheria in tourists returning from western Africa to Sweden, March 2012

E Lindhusen-Lindhé (eva.lindhusen@vgregion.se)[1], L Dotevall[1], M Berglund[2]
1. Department for Communicable Disease and Control, Västra Götaland Region, Sweden
2. Departement for ENT Diseases, Trollhättan, Västra Götaland Region, Sweden

Citation style for this article:
Lindhusen-Lindhé E, Dotevall L, Berglund M. Imported laryngeal and cutaneous diphtheria in tourists returning from western Africa to Sweden, March 2012. Euro Surveill. 2012;17(23):pii=20189. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20189

Article submitted on 25 May 2012 / published on 7 June 2012

In March 2012 a 68-year-old woman was diagnosed with laryngeal diphtheria in a hospital in Västra Götaland Region, Sweden. Six days before symptom onset she had returned from a trip to western Africa where she had travelled accompanied by her husband. During the investigation, the 76-year-old husband was diagnosed with cutaneous diphtheria. Both patients were incompletely vaccinated against diphtheria.

Case report

On 27 March 2012, a 68-year-old woman presented to the Ear, Nose and Throat (ENT) department in a hospital in Västra Götaland Region, western Sweden, with a five-day history of fever, coughing, hoarseness and increasing pain in the throat. She had a medical history of adult-onset diabetes mellitus and was under investigation for thrombocytopenia and suspected liver cirrhosis.

Six days prior to the onset of fever and throat symptoms she had returned from a two-week holiday in western Africa where she had travelled together with her husband and a friend.

Upon hospital admission, she presented with fever (38.1°C), swelling of her soft palate and severe pain in the throat. A laryngoscopy was performed on the same day and revealed greyish membranes on and surrounding the vocal cords and the base of the tongue, and swollen larynx. These changes could not be seen by ordinary throat examination. Upon admission, the blood count was only mildly affected with slight decrease of the platelet count of 119 x 10^9 / L, (norm: 165–387 x 10^9 / L) and a total white blood cell count of 6.0 x 10^9 / L, (norm: 3.5–8.8 x10^9 / L) neutrophils 75%. C-reactive protein was 46 mg/L (norm: < 5 mg/L) and serum creatinine, 76 µmol/L (norm: 45–90 µmol/L).

She had been referred to the ENT ward from the primary care clinic with an initial suspicion of a viral or fungal infection. On initial examination, the ENT physician suspected diphtheria although she had never encountered a case. Throat, nasal swabs and blood samples were sent for culture and sensitivity and the possibility of diphtheria was mentioned to the microbiology laboratory. However, the main suspected condition was fungal infection, and initially anti-fungal treatment was started.

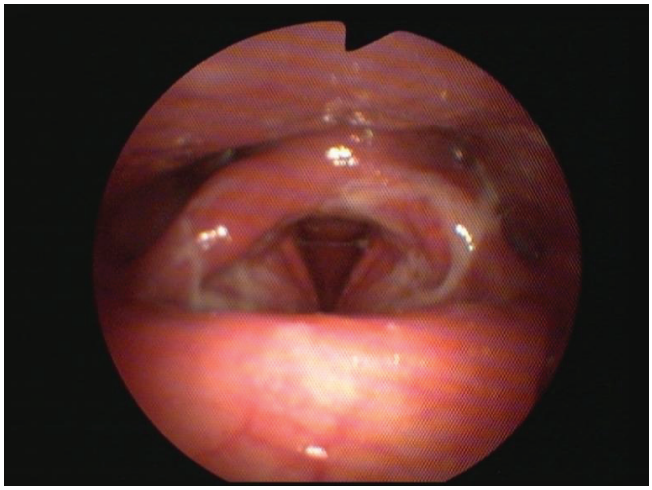
The condition of the patient remained stable but due to the fever and throat pain symptoms antibiotic treatment with intravenous benzylpenicillin for a 14-day period was initiated three days after admission when the diphtheria was reconsidered as diagnosis because of primary treatment failure.

The Figure shows the laryngoscopy of the case four days after antibiotic treatment.

On the seventh day after hospital admission, the microbiology laboratory alerted the clinicians that a penicillin-sensitive strain of *Corynebacterium diphtheriae* grew from the throat culture. The Department of Communicable Disease Control and Prevention was notified immediately. The strain was sent to the Reference Laboratory (which

Figure

Laryngoscopy of index diphtheria case, four days after antibiotic treatment, Sweden, March 2012



reports only gravis or non gravis strains) at the Swedish Institute for Communicable Disease Control (SMI, Solna) and eventually typed as a *biovar non gravis* strain with toxin production. Antitoxin treatment was not given since the patient was not systemically ill and there were no signs of renal or neurological complications. Her general condition improved after commencement of antibiotic treatment.

Contact tracing

Upon receipt of the culture result, tracing of close contacts of the index case was initiated immediately. In total, we examined 12 persons, none of them had any diphtheria symptoms and all were fully vaccinated against diphtheria.

Travel companions

The 76-year-old husband experienced several insect bites with secondary infection on his legs during the journey to western Africa. Several small secondary infected ulcers with purulent secretion and impetigo-like appearance on his lower extremities were identified upon examination. He wasn't febrile or markedly ill during this period. Medical history revealed that he had probably received one earlier dose of vaccine against diphtheria during his military service in mid-1950s and a booster dose (combined tetanus-diphtheria vaccine) due to a minor injury more than 20 years ago. Cultures from throat and nose were collected, he was vaccinated against diphtheria, and he started prophylactic antibiotic treatment with erythromycin. He remained well and had no fever or mucosal symptoms. However, cultures from his wounds and pharynx were positive for toxin producing *C. diphtheriae*. *Streptococcus pyogenes* (Lancefield group A streptococcus) was also found. His clinical picture was interpreted as a mild cutaneous diphtheria without toxic symptoms. On the follow-up visit, his wounds appeared to have healed, and he showed no other signs of complication. Our speculation is that he may have been the source of infection for our index case, who had no skin lesions [1,2].

The other travel companion was found to be completely unvaccinated against diphtheria. The culture results from their throat and nasal swabs were negative. They had received penicillin for a few days after arriving home for an unspecific soft tissue infection before culture was performed. They presented no other infective symptoms or complications.

Other family members

Children and grandchildren of the index case and of the husband were all vaccinated against diphtheria. A pregnant woman who had been in contact with the index case received a booster diphtheria vaccine dose since she was unsure whether she had received a booster previously. No other family members met the index case while she was contagious. No secondary cases were found.

Healthcare workers

The staff of the ENT department was also interviewed. Only a few of them could have been exposed to the saliva or sputum from the patient and were given an additional dose of diphtheria vaccine. The examining doctors who supposedly had the largest risk of getting the infection during throat examination were fully vaccinated against diphtheria. In accordance with the current recommendations [3], prophylaxis was not given to the healthcare workers.

Discussion

Diphtheria is a very rare disease in most European countries today. In 2009, 15 confirmed diphtheria cases were reported in five European countries, 47 were reported in 2008 and 21 in 2007 [4]. Occasional cases may therefore be undiagnosed and easily missed [1,2,5,6]. Correct treatment is therefore often delayed, as in the above cases. Unpublished data confirm previous findings that indicate that a large proportion of the Swedish citizens born before the general introduction of diphtheria vaccination have inadequate immunity against diphtheria and tetanus [7]. These age groups are often active travellers to endemic regions for diphtheria. In the absence of effective vaccine registration, both patients and doctors hesitate as to whether or not give primary vaccination when the patient seeks vaccination advice before travel. Our index patient is an experienced global traveller and has visited several travel medicine clinics during the recent years. Both the physicians in the travel medicine clinic and the patient presumed that she was properly vaccinated against diphtheria and no further investigations were made. There was no documentation of her earlier immunisation status. She was therefore given a booster dose. People travelling outside Europe and North America should always upgrade their diphtheria vaccination if not given within the last 20 years according to recommendations from the National Health Board in Sweden [7]. Tetanus vaccination is of course required even within Europe. Although vaccination does not guarantee immunity from contracting diphtheria, the protective effect against severe disease has been proved [1,2].

Cutaneous diphtheria is less well recognised than respiratory infection. Signs and symptoms of the soft tissue infection due to *C. diphtheriae* may be mild and unspecific and may occur even in fully vaccinated patients [1,2]. Microbiological laboratories often do not look for *C. diphtheriae* routinely in throat swab or wound specimen. Furthermore, a co-infection due to *Staphylococcus aureus* or *S. pyogenes* is sometimes reported and may mask or delay the diagnosis of cutaneous diphtheria. Cutaneous diphtheria may cause secondary respiratory and cutaneous infections and may even be a source of outbreaks [1].

Conclusion

Although seldom encountered, diphtheria must be kept in mind when patients with respiratory symptoms, swollen palate and swollen neck ('bull neck') are admitted to hospital after returning from journeys in regions outside Europe and North America. It is also important to detect diphtheria in wound infections to avoid secondary transmission and to be aware of the possibility of toxic complications. Clinicians should be alerted to culture for diphtheria in patients with wound infections after journeys to endemic regions, and to alert the microbiologist that diphtheria may be a possible diagnostic. Vaccination advice to travellers to diphtheria-endemic areas should include upgraded vaccination against the disease. Single travel-related cases reinforce the importance of up-to-date immunisation especially in travellers to endemic countries. They also serve as reminders that clinicians need to be aware of the possibility of diphtheria, and to decrease the complacency that currently exists in many European countries concerning vaccine coverage in the adult population [8].

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A large outbreak of conjunctivitis on Mayotte Island, France, February to May 2012

T Lernout (tinne.lernout@ars.sante.fr)[1], O Maillard[2], S Boireaux[2], L Collet[2], L Filleul[1]
1. Regional office of the French Institute for Public Health Surveillance (Institut de veille sanitaire-InVS), Mayotte, France
2. Hospital Centre of Mayotte, Mayotte, France

Citation style for this article:
Lernout T, Maillard O, Boireaux S, Collet L, Filleul L. A large outbreak of conjunctivitis on Mayotte Island, France, February to May 2012. Euro Surveill. 2012;17(23):pii=20192. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20192

Article submitteed on 1 June 2012 / published on 7 June 2012

From February to May 2012, Mayotte experienced an outbreak of acute conjunctivitis with over 12,000 estimated cases, causing a significant burden on the primary healthcare system. It was most certainly caused by a coxsackievirus, as documented by isolation from a symptomatic traveller from the Comoros Islands in France. Tropical climate and poor hygiene conditions facilitate the spread of infectious diseases on Mayotte and in the region with risk of further exportation to mainland France and Europe.

There is anecdotal evidence that large epidemics of conjunctivitis occurred on Mayotte in the past, but no outbreak had been reported for over 15 years. In mid February 2012, several general practitioners (GP) belonging to a sentinel surveillance network reported an increase in patients consulting with acute conjunctivitis. Patients presented clinically with sudden onset of redness, marked swelling and pain often in both eyes. All were living in the town of Sada, on the east cost of Grande Terre [1].

Mayotte, located in the northern Mozambique Channel in the Indian Ocean (Figure 1), is a French overseas department with a maritime tropical climate. The hot and humid rainy season usually starts in November and lasts until May. Mayotte is made up of two islands, Grande Terre and Petite Terre with a surface of around 374 km^2. The island is very densely populated and has around 200,000 inhabitants of whom 53% are under 20 years of age [2]. General hygiene and living conditions are poor. Given the proximity of Mayotte and the Comoros, both part of the Comoros archipelago, travel (legal and illegal movements) between the islands is frequent.

Outbreak description

To describe the outbreak of acute conjunctivitis and evaluate its impact on the healthcare system, two sources of data were used (i) the number of conjunctivitis cases and total number of outpatients seen by GPs geographically spread throughout the island, who belong to a sentinel GP network, and (ii) the numbers of topical antibiotics or steroid treatments distributed by the 17 public health centres on the island, provided by the central pharmacy of the hospital centre of Mayotte.

The GP sentinel surveillance system was set up in Mayotte in 2009, for influenza-like illness by the regional office (Cire) of the French Institute for Public Health Surveillance (Institut de Veille Sanitaire) as response to the influenza A(H1N1)pdm 2009 pandemic [3]. It covers 36% of the primary care facilities in Mayotte and has since been extended to surveillance of diarrhoeal diseases and asthma as well as other syndromes, whenever needed to describe epidemics. As soon as the increase in the number of patients presenting with conjunctivitis was observed, the sentinel GPs were requested to report weekly data on the number of cases to the Cire. Information on sex and age was not requested.

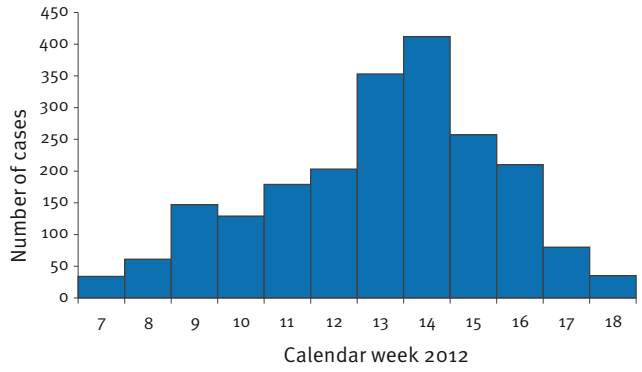
Figure 1

Location of Mayotte

[a] Mayotte lies within the Comoros archipelago.

Figure 2

Epidemic curve of conjunctivitis cases, based on the number of patients consulting sentinel general practitioners, Mayotte, February-May 2012 (n=2,100)



The epidemic started in week 7 (mid February) reached a peak at the end of March with 353 cases reported by sentinel GPs in week 13 and 412 cases in week 14 and ended in May (Figure 2). It lasted 10 weeks in total and reached normal level in week 19. From the east coast of Grande Terre where the outbreak started, it spread progressively across the territory, first towards the south and then to the north and the smaller island of Petite Terre (Figure 3).

In the sentinel sites in healthcare centres, 2,100 cases were recorded. Conjunctivitis patients represented up to 45% of the total activity at these centres during the epidemic period. The weekly distribution of topical treatments was in line with the epidemiological curve. No severe cases were reported and no cases were hospitalised.

The total number of conjunctivitis cases consulting one of the public healthcare centres on Mayotte over the 10-week period is estimated at more than 12,000 individuals, around 6% of the total population. The weekly number of conjunctivitis patients consulting any healthcare centres ranged from 660 to almost 1,700, reaching a peak at week 14 with 23% of the total number of consultations. These estimations neither include patients consulting a private GP (n=21) nor those who did not seek medical care.

Laboratory investigations

Laboratory analysis on 13 conjunctival swabs randomly collected by sentinel GPs did not identify any particular bacteria. Of three swabs tested for viruses by a laboratory in mainland France, two were positive for enterovirus, not further typed.

Public health measures

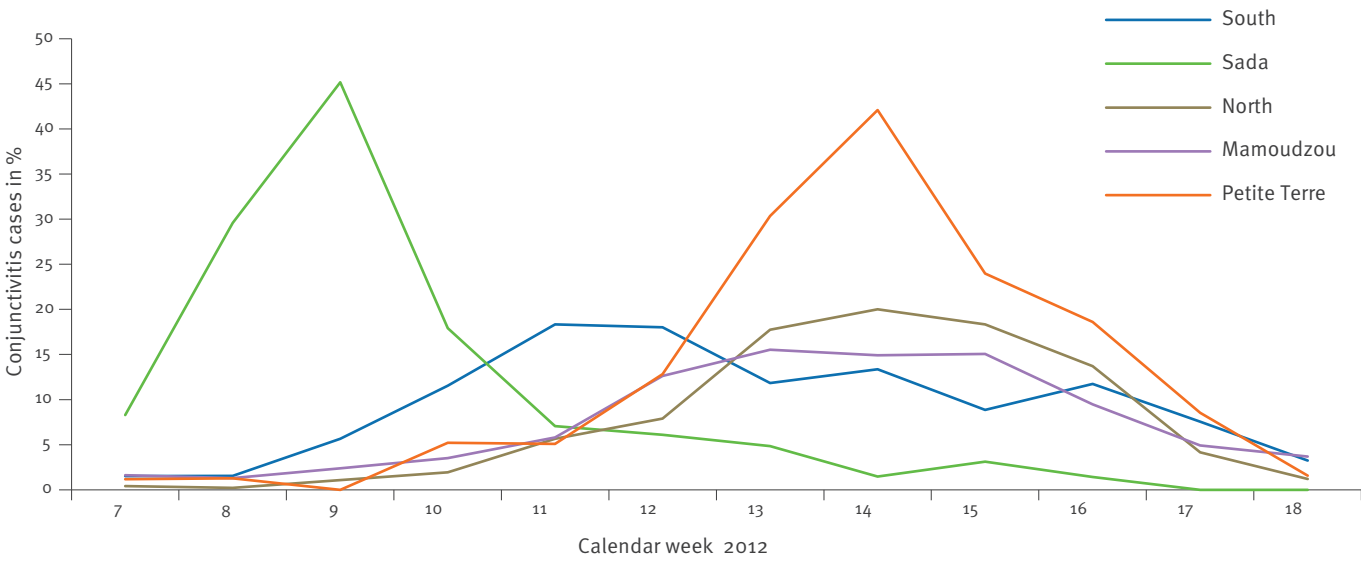
Although general living conditions of the population of Mayotte are poor, 82% of the households have a television [4]. Public health messages on hygiene practices have been broadcasted through local media, both radio and television [5]. Since 40% of the population are school-aged children, communication on preventive measures also took place at public primary and secondary schools.

Conclusions

Due to the tropical climate, high population density and poor hygiene standards, the population of Mayotte is largely exposed to infectious diseases. Although no severe cases have been reported, the outbreak of conjunctivitis that occurred from February to May caused widespread morbidity across the island with an important burden on the primary healthcare system.

Figure 3

Proportion of conjunctivitis cases compared to total number of patients consulting sentinel general practitioners by week and by location, Mayotte, February-May 2012



The outbreak on Mayotte is in line with what has been described elsewhere. Epidemics of viral conjunctivitis are mostly attributed to adenoviruses and enteroviruses (including coxsackievirus A) [6]. They occur mainly in tropical countries during hot, rainy seasons and in densely populated areas [7].

In May 2012, coxsackievirus A24 was isolated from a traveller with haemorrhagic conjunctivitis, returning from Comoros Island [8], where an outbreak of conjunctivitis was described by the local press [9]. This supplementary information leads us to conclude that the outbreak in Mayotte is most certainly caused by the same virus which is circulating in the Comoros archipelago.

The frequent movement of people between Mayotte and the Comoros Islands facilitates the spread of infectious diseases in the region and there is a risk of further exportation to mainland France and Europe through returning travellers.

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European scientific conference on applied infectious disease epidemiology (ESCAIDE) 2012 – call for abstracts

Eurosurveillance editorial team (eurosurveillance@ecdc.europa.eu)[1]
1. European Centre for Disease Prevention and Control (ECDC), Stockholm, Sweden

Citation style for this article:
Eurosurveillance editorial team. European scientific conference on applied infectious disease epidemiology (ESCAIDE) 2012 – call for abstracts. Euro Surveill. 2012;17(23):pii=20191. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20191

Article published on 7 June 2012

The sixth European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) will take place in Edinburgh, United Kingdom, from 24 to 26 October 2012.

As every year, ESCAIDE 2012 will draw together professionals from around the world to present and discuss developments in infectious disease prevention and control.

The call for abstracts for the conference is now open, and abstracts can be submitted via the dedicated 'call for abstracts' portal on the ESCAIDE website (http://www.escaide.eu/). The closing date for submissions is 13 July 2012.

Abstracts are welcomed in all areas related to infectious disease intervention, including epidemiology, public health microbiology, surveillance, and the application of tools and methods to control and prevent communicable disease. The 2012 ESCAIDE has a special abstract theme; 'Epidemiology and Microbiology as partners in infectious disease control'. Hence abstracts which highlight the interaction between microbiology and epidemiology in supporting public health intervention and disease control are particularly welcomed.

The conference programme includes planned keynote sessions on the following topics:

- zoonoses: the detection and management of emerging infections at the human/animal interface;
- vulnerability in 21st century public health;
- public health microbiology: microbiology and epidemiology as partners in infectious disease detection and control;
- vaccination: effectiveness, safety and implementation strategies for current and future vaccines.
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The final programme details and conference registration instructions will be posted soon on the ESCAIDE website. It is expected that ESCAIDE 2012 participants can receive Continuing Medical Education (CME) credits for attending the conference.

For further information, contact:
escaide.conference@ecdc.europa.eu