its features in culture were atypical (*3*). In 2015, Sigler determined that this isolate belonged to a new *Emmonsia*-like species, which she described as *E. helica* (*3*). Another fatal case of *Emmonsia* infection was reported from California in a patient after an orthotopic liver transplant (*4*). An isolate from that patient also was confirmed as *E. helica* (I. Schwartz et al., unpub. data).

Although the travel history for the second case-patient was not reported (*4*) and the patient in this report had resided in Mexico, these cases suggest that the area of endemicity of *E. helica* may include California. This finding is further supported by 2 other fatal cases of atypical mycoses reported in HIV-infected men from California (*5*); histopathologic findings of hyphae and multiple budding yeasts were consistent with *E. helica* (I. Schwartz et al., unpub. data). Investigations are under way to characterize the geographic and host range of *E. helica* and to clarify the phylogenetic relationships among members of the family *Ajellomycetaceae* comprising the genera *Emmonsia*, *Blastomyces*, *Histoplasma* and others because recent studies have uncovered far greater complexity than previously supposed (*1*,*6*).

Acknowledgments

We thank Valerie Ng, Nancy Li, Ken Schneider, Louise Troung, and Sudharshan Parthasarathy for the radiographic and histopathologic images used in the Figure. We also thank James Scott for his assistance with the case.

About the Author

Dr. Rofael is a third-year internal medicine resident at Alameda County Medical Center in Oakland, California. His research interests include pulmonary medicine, critical care, infectious diseases, and global medicine in resource-poor settings.

References

1. Schwartz IS, Kenyon C, Feng P, Govender NP, Dukik K, Sigler L, et al. 50 Years of *Emmonsia* disease in humans: the dramatic emergence of a cluster of novel fungal pathogens. PLoS Pathog. 2015;11:e1005198. http://dx.doi.org/10.1371/journal.ppat.1005198
2. Sigler L. *Emmonsia helica* Sigler sp. nov. Index Fungorum 2015: 237 [cited 2017 Oct 26]. http://www.indexfungorum.org/Publications/Index%20Fungorum%20no.237.pdf
3. Sekhon AS, Jackson FL, Jacobs HJ. Blastomycosis: report of the first case from Alberta, Canada. Mycopathologia. 1982;79:65–9. http://dx.doi.org/10.1007/BF00468081
4. Kappagoda S, Adams JY, Luo R, Banaei N, Concepcion W, Ho DY. Fatal *Emmonsia* sp. infection and fungemia after orthotopic liver transplantation. Emerg Infect Dis. 2017;23:346–9. http://dx.doi.org/10.3201/eid2302.160799
5. Tan G, Kaufman L, Peterson EM, de la Maza LM. Disseminated atypical blastomycosis in two patients with AIDS. Clin Infect Dis. 1993;16:107–11. http://dx.doi.org/10.1093/clinids/16.1.107
6. Dukik K, Muñoz JF, Jiang Y, Feng P, Sigler L, Stielow JB, et al. Novel taxa of thermally dimorphic systemic pathogens in the *Ajellomycetaceae* (*Onygenales*). Mycoses. 2017;60:296–309. http://dx.doi.org/10.1111/myc.12601

Address for correspondence: Martin Rofael, Alameda County Medical Center—Internal Medicine, 1411 E 31st St,. A2 QIC 22130, Oakland, CA, 94602-1018 USA; email: mrofael@gmail.com

Costs of Conjunctivitis Outbreak, Réunion Island, France

Laurent Filleul, Frederic Pagès, Guy-Noel Chan Wan, Elise Brottet, Pascal Vilain

Author affiliations: Santé Publique France, French National Public Health Agency, Saint-Denis, Réunion, France (L. Filleul, F. Pagès, E. Brottet, P. Vilain); Agence Régionale de Santé Océan Indien, Regional Public Health Authority, Saint-Denis (G.-N.C. Wan)

DOI: https://doi.org/10.3201/eid2401.170916

During January–April 2015, a major outbreak of conjunctivitis on Réunion Island caused a large public health impact. On the basis of general practitioner consultations, emergency department visits, and eye medication sales during the 13-week epidemic, we estimated a total healthcare cost of €3,341,191 from the outbreak.

During January–April 2015, a major outbreak of acute hemorrhagic conjunctivitis occurred on Réunion Island, causing a heavy impact on the national healthcare system of France (*1*). Réunion Island, a French overseas administrated territory, is located in the Indian Ocean between Madagascar and Mauritius; it has a surface area of 2,512 km^2 and a population of ≈840,000 (1.3% of France's population, including the nation's overseas territories; https://www.insee.fr/fr/statistiques/2119468).

The island is included in the national health insurance (NHI) program of France. Réunion Island's health system is similar to that of France; however, most patients on the island do not pay provider health fees directly. NHI pays the general practitioner (GP), the pharmacist, or hospital. Rarely, the patients pay for the GP consultations and emergency department (ED) visits, but these costs will be refunded to the patients by the NHI. Healthcare costs are higher (≈30%) on the island than in mainland France. In 2015, total healthcare expenditures in Réunion Island were

€2.561 billion; which is 1.6% of France's healthcare spending (≈€163 billion) for that year.

A syndromic surveillance system, the Organisation de la surveillance coordonnée des urgences (Organization of coordinated emergency surveillance [OSCOUR]) network, is based on data collected by all EDs across the country, including in French overseas territories (*2*). Data are collected daily directly from patients' computerized medical files that are completed during medical consultations. For each ED visit, patient age, sex, city of residence, and the diagnosis are recorded. This enables analysis by syndromic groups, age groups, and geographic areas. The diagnosis is categorized according to the International Classification of Diseases, 10th edition (ICD-10; http://www.icd10data.com/). Public health indicators are routinely monitored by using temporal and spatiotemporal analyses, including the number of ED visits for conjunctivitis (ICD-10 code B30 and subcodes, code H10 and subcodes, and code H11 and subcodes).

At the end of January 2015, by using spatiotemporal analysis of data from the OSCOUR network, we detected a cluster of conjunctivitis cases in the western part of the island that occurred during January 26–February 1 (week 5 of 2015). We organized conjunctivitis surveillance within the framework of an existing sentinel project involving 56 volunteer GPs located throughout the island who reported weekly to the Indian Ocean regional institute for public health surveillance agency, known as Cire OI (*3*).

The outbreak on Réunion Island began during week 5 then quickly spread throughout the island and ended in week 17 (end of April) of 2015. Data from ED visits show that all age groups were affected. By using the GP sentinel network and NHI data (*1*), we estimated the total number of GP consultations for conjunctivitis on the island to be 100,094. During this outbreak, we sent regular epidemiologic updates to health professionals to inform them of the ongoing epidemiologic situation and available preventive measures. Health authorities also published a press release for the general public.

On the basis of these data and the major impact for public health, we estimated the cost of this outbreak. We compiled the cost of different indicators: GP consultations, ED visits, and eye medication sales. On Réunion Island, a GP consultation fee of €27.60 and an ED visit fee of €52.60 are reimbursed by NHI. For medicated eye drop sales, we extracted data (number of sales by week and cost) from France's NHI information system, SNIIR-AM (*4*). During the outbreak period, 187,126 medicated eye drop kits were purchased and reimbursed, at a total cost of €566,443. For activity related to conjunctivitis, the cost for GP consultations was €2,762,597 and for ED visits was €12,151 (Table). During weeks 5–17, the healthcare cost was estimated at €3,341,191. The total cost is underestimated, however, because it did not include costs to individuals and businesses, including sick leave, work absenteeism of parents for sick children, and some persons who had conjunctivitis but did not consult a physician.

These data demonstrate that acute outbreaks of illness caused by nonfatal agents can have substantive public health and economic impact. In France, where medical costs are reimbursed by the state, an outbreak of this magnitude, even if virulence is negligible, should be examined thoroughly. Information for the public and health professionals should be strengthened by recurring prevention campaigns with a focus on hygiene, such as washing hands frequently; avoiding rubbing the eyes; covering one's mouth and nose when coughing or sneezing; and avoiding sharing linen, towels, or any objects owned by affected persons.

Acknowledgments

We acknowledge the sentinel general practitioners of Réunion, the emergency departments of Réunion, and the supplier of pharmacies CERP Réunion SAS.

Table. Weekly volume and total costs of medicated eye drop sales, consultations with GPs, and ED visits for conjunctivitis outbreak, Réunion Island, France, January–April, 2015*

Epidemiologic week	No. eye drop sales	No. GP consultations for conjunctivitis	No. ED visits for conjunctivitis	Total cost of eye drop sales, €	Total cost of GP consultations, €	Total cost of ED visits, €
5	7,126	2,641	19	21,206	72,887	999
6	6,818	1,937	9	20,198	53,453	473
7	10,379	3,537	17	31,199	97,617	894
8	14,079	7,439	17	42,646	205,326	894
9	25,831	13,845	33	78,083	382,108	1,736
10	27,345	20,895	41	82,198	576,711	2,157
11	31,866	20,648	21	101,453	569,892	1,105
12	15,339	9,141	15	46,990	252,279	789
13	14,726	6,954	17	43,034	191,921	894
14	11,049	4,832	13	32,717	133,371	684
15	8,180	3,369	17	24,166	92,977	894
16	8,109	2,593	9	24,040	71,574	473
17	6,279	2,264	3	18,514	62,479	158
Total by category	187,126	100,094	231	566,443	2,762,597	12,151
Total costs					3,341,191	

*ED, emergency department; GP, general practitioners.

About the Author

Dr. Filleul is a field epidemiologist at the French National Public Health Agency. His research interests focus on the early detection and investigation of infectious disease outbreaks in order to implement control measures.

References

1. Marguerite N, Brottet E, Pagès F, Jaffar-Bandjee MC, Schuffenecker I, Josset L, et al. A major outbreak of conjunctivitis caused by coxsackievirus A24, Réunion, January to April 2015. Euro Surveill. 2016;21:30271. http://dx.doi.org/10.2807/1560-7917.ES.2016.21.26.30271
2. Josseran L, Fouillet A, Caillère N, Brun-Ney D, Ilef D, Brucker G, et al. Assessment of a syndromic surveillance system based on morbidity data: results from the Oscour network during a heat wave. PLoS One. 2010;5:e11984. http://dx.doi.org/10.1371/journal.pone.0011984
3. Brottet E, Jaffar-Bandjee MC, Rachou E, Polycarpe D, Ristor B, Larrieu S, et al. Sentinel physician's network in Reunion Island: a tool for infectious diseases surveillance. Med Mal Infect. 2015;45:21–8. http://dx.doi.org/10.1016/j.medmal.2014.11.004
4. Tuppin P, de Roquefeuil L, Weill A, Ricordeau P, Merlière Y. French national health insurance information system and the permanent beneficiaries sample. Rev Epidemiol Sante Publique. 2010;58:286–90. http://dx.doi.org/10.1016/j.respe.2010.04.005

Address for correspondence: Laurent Filleul, Santé Publique France, Cire OI, 2 bis avenue Georges Brassens, Saint Denis 97408 Réunion, France; email: laurent.filleul@ars.sante.fr

Dengue Fever in Burkina Faso, 2016

Zékiba Tarnagda, Assana Cissé, Brice Wilfried Bicaba, Serge Diagbouga, Tani Sagna, Abdoul Kader Ilboudo, Dieudonné Tialla, Moussa Lingani, K. Appoline Sondo, Issaka Yougbaré, Issaka Yaméogo, Hyacinthe Euvrard Sow, Jean Sakandé, Lassana Sangaré, Rebecca Greco, David J. Muscatello

Author affiliations: Institut de Recherche en Sciences de la Santé, Bobo-Dioulasso, Burkina Faso (Z. Tarnagda, A. Cissé, S. Diagbouga, T. Sagna, A.K. Ilboudo, D. Tialla, M. Lingani); Ministère de la Santé Direction de la Lutte Contre la Maladie, Ouagadougou, Burkina Faso (B.W. Bicaba, I. Yaméogo, H.E. Sow); Centre Hospitalier Universitaire Yalgado Ouédraogo, Ouagadougou (K.A. Sondo, J. Sakandé, L. Sangaré); Sanofi Pasteur Limited, Toronto, Ontario, Canada (I. Yougbaré); US Centers for Disease Control and Prevention, Ouagadougou (R. Greco); University of New South Wales, Sydney, New South Wales, Australia (D.J. Muscatello)

DOI: https://doi.org/10.3201/eid2401.170973

We report 1,327 probable cases of dengue in Burkina Faso in 2016. Of 35 serum samples tested by a trioplex test, 19 were confirmed dengue virus (DENV)–positive: 11 DENV-2, 6 DENV-3, 2 nontypeable, and 1 DENV-2/DENV-3 coinfection. Molecular testing should be conducted to correctly identify causative agents in this complex infectious disease landscape.

Dengue is an emerging viral disease mainly found in the tropical and subtropical zones, and a major public health concern worldwide (*1*–*3*). Dengue fever is a mosquitoborne viral infection caused by 4 distinct dengue viruses (DENVs): DENV-1–4. In some countries of sub-Saharan Africa, the circulation of all 4 viruses has been reported (*4*). However, availability of rapid tests and molecular diagnosis by reverse transcription PCR (RT-PCR) in resource-limited settings remains a challenge.

During October 29, 2016–November 21, 2016, we screened 1,947 suspected dengue cases using a rapid diagnostic test (SD BIOLINE Dengue Duo, Standard Diagnostics, Seoul, South Korea), which detects DENV nonstructural protein 1 (NS1) and dengue-specific antibodies (IgM and IgG), in response to an outbreak of acute febrile illness in Burkina Faso. All patients with acute febrile illness during this period were suspected to have dengue; notably, some patients had biphasic fever with severe headache, myalgia, arthralgia, and rash. Patients who tested positive for NS1 or DENV antibodies were considered to have a probable DENV infection. All participants provided informed consent as specified by the Declaration of Helsinki, and approval of this study was obtained from the national ethics committee.

Of the 1,947 blood samples tested, 1,327 were positive for NS1, DENV antibodies, or both. Of the 13 country regions investigated, the central region, which includes the city of Ouagadougou, was the most affected, having 1,679 of the 1,947 suspected cases (case fatality ratio 1.2% [20/1,679]) and 1,307 of the 1,327 probable cases. Of the 20 deceased patients, 18 were positive for NS1 and 2 were positive for NS1 and DENV IgM. The outbreak peaked November 11–14. Blood samples from 35 randomly selected patients were sent to the National Reference Laboratory for Influenza (Bobo-Dioulasso, Burkina Faso) for confirmation using the Centers for Disease Control and Prevention trioplex real-time RT-PCR protocol (*5*) followed by singleplex to identify the infecting DENV serotype. Of the 35 patient samples that were selected, 22 were positive for NS1, 3 were positive for both NS1 and IgG, 3 were positive for IgG, 2 were