its features in culture were atypical (3). In 2015, Sigler
determined that this isolate belonged to a new Emmon-
sia-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 con-
firmed 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 re-
sided in Mexico, these cases suggest that the area of en-
demicity of E. helica may include California. This finding
is further supported by 2 other fatal cases of atypical my-
coses 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 fam-
ily Ajellomyctecae comprising the genera Emmonsia,
Blastomyces, Histoplasma and others because recent studies
have uncovered far greater complexity than previously
supposed (1,6).

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and Sudharshan Parthasarathy for the radiographic and
histopathologic images used in the Figure. We also thank
James Scott for his assistance with the case.

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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 emerg-
http://dx.doi.org/10.1371/journal.ppat.1005198
2. Sigler L. Emmonsia helica Sigler sp. nov. Index Fungorum 2015:
http://dx.doi.org/10.1007/BF00468081
http://dx.doi.org/10.3201/eid2302.160799
http://dx.doi.org/10.1111/myc.12601

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Costs of Conjunctivitis Outbreak, Réunion Island, France

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During January–April 2015, a major outbreak of conjunctivi-
tis 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 be-
 tween Madagascar and Mauritius; it has a surface area of
2,512 km² 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

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€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 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*

<table>
<thead>
<tr>
<th>Epidemicologic week</th>
<th>No. eye drop sales</th>
<th>No. GP consultations for conjunctivitis</th>
<th>No. ED visits for conjunctivitis</th>
<th>Total cost of eye drop sales, €</th>
<th>Total cost of GP consultations, €</th>
<th>Total cost of ED visits, €</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>7,126</td>
<td>2,641</td>
<td>19</td>
<td>21,206</td>
<td>72,887</td>
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<td>1,937</td>
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<td>20,198</td>
<td>53,453</td>
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</tr>
<tr>
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<td>10,579</td>
<td>3,537</td>
<td>17</td>
<td>31,199</td>
<td>97,617</td>
<td>894</td>
</tr>
<tr>
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<td>14,079</td>
<td>7,439</td>
<td>17</td>
<td>42,646</td>
<td>205,326</td>
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</tr>
<tr>
<td>9</td>
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<td>13,845</td>
<td>33</td>
<td>78,083</td>
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<td>10</td>
<td>27,345</td>
<td>20,895</td>
<td>41</td>
<td>82,198</td>
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<tr>
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<tr>
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<tr>
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<td>9</td>
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<td>71,574</td>
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<tr>
<td>17</td>
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<td>2,264</td>
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<td>Total by category</td>
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<td>100,094</td>
<td>231</td>
<td>566,443</td>
<td>2,762,597</td>
<td>12,151</td>
</tr>
<tr>
<td>Total costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3,341,191</td>
</tr>
</tbody>
</table>

*ED, emergency department; GP, general practitioners.
Dengue Fever in Burkina Faso

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

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References

Dengue Fever 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 co-infection. Molecular testing should be conducted to correctly identify causative agents in this complex infectious disease landscape.

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 co-infection. 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 mosquito-borne 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 1,327 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...