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Dengue Fever in Burkina Faso, 2016

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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

positive for both NS1 and IgM, 1 was positive for both IgM and IgG, and 4 were negative. Nineteen (54.3%) cases were positive for DENV, and no cases were positive for Zika or chikungunya viruses (Table). Eleven patients were infected with DENV-2, 6 were infected with DENV-3, and 1 patient was co-infected with DENV-2 and DENV-3. We submitted our samples to the World Health Organization Collaborating Centre for Arbovirus Reference and Research, Institut Pasteur de Dakar (Dakar, Senegal), which confirmed our results.

In Burkina Faso, dengue represents an added burden to an infectious disease landscape dominated by malaria; therefore, implementation of molecular diagnostic testing is urgently needed to identify the correct etiologic agent associated with the disease. The trioplex real-time RT-PCR detected 19 cases of DENV. A total of 3 serum samples positive for NS1 were negative by this assay. These negative results can be explained in part by declining viremia levels that became undetectable around the time of molecular testing, although testing with a larger representative sample size could have provided more information.

We found DENV-2 to be the dominant serotype in this outbreak, followed by DENV-3. No cases of DENV-1 or DENV-4 were found, although testing a larger number of specimens might have revealed the co-circulation of these DENV serotypes. Human cases of DENV-2 in Burkina Faso is supported by previous reports of DENV-2 circulating in mosquitoes (*6*). The presence of DENV-3 in Burkina Faso is not surprising, considering this serotype has been previously reported in the region; in 2009, DENV-3 was the main etiologic virus of the outbreak in Cape Verde, which affected >17,000 persons, and was reported in 6 persons in Senegal who traveled to Italy and died (*7*). DENV-3 was also detected in the DENV outbreak in Côte d'Ivoire in 2008 (*8*).

We speculate that increased international travel between neighboring countries and mosquito circulation has led to DENV-2 and DENV-3 successfully crossing the border into Burkina Faso. This pilot study shows DENV-2 and DENV-3 are both circulating in Burkina Faso and causing human disease. Molecular diagnostics, vector control strategies, and risk communication should be implemented in Burkina Faso in preparation for future outbreaks.

Table. Characteristics and rRT-PCR results of patients with dengue fever, Burkina Faso, 2016*

Variable	No. (%)	95% CI
Age, y		
2–9	2/35 (5.71)	NA
10–19	3/35 (8.57)	NA
20–29	8/35 (22.85)	NA
30–39	9/35 (25.71)	NA
40–49	9/35 (25.71)	NA
≥50	2/35 (5.71)	NA
Unknown	2/35 (5.71)	NA
Sex		
M	24/35 (68.57)	NA
F	8/35 (22.85)	NA
Unknown	3/35 (8.57)	NA
Molecular diagnostic		
rRT-PCR trioplex	19/35 (54.3)	34.78–70.78
rRT-PCR DENV-1–4	17/19 (89.4)	75.68–103.26
DENV-1	0 (0)	NA
DENV-2	11/19 (57.8)	35.69–80.09
DENV-3	6/19 (31.5)	11.57–51.57
DENV-4	0 (0)	NA
DENV-2 + DENV-3	1/19 (5.26)	4.74–15.26
Unknown serotype	2/19 (10.5)	7.2–23.52

*Of the 35 patient samples used, 31 were positive and 4 were negative by SD BIOLINE Dengue Duo (Standard Diagnostics, Seoul, South Korea). DENV, dengue virus; NA, not applicable; rRT-PCR, real-time reverse transcription PCR.

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Increasing Number of Scarlet Fever Cases, South Korea, 2011–2016

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The increasing number of reported scarlet fever cases during 2011–2016 in the National Notifiable Infectious Disease database in South Korea occurred because of increased overall reporting and expanded reporting criteria rather than because of increasing scarlet fever incidence. Further increases are anticipated because of other expansions in reporting requirements.

Studies suggest that scarlet fever incidence has been increasing in South Korea (Republic of Korea) and other countries of East Asia since 2011 (*1*–*3*). The report describing increased numbers of scarlet fever cases in South Korea was based on National Notifiable Infectious Disease (NNID) surveillance data, which comprises cases reported through an electronic system to the Korea Centers for Disease Control and Prevention (*4*). In South Korea, scarlet fever is categorized as a group 3 NNID, which requires continuous surveillance and the establishment of control measures against possible outbreaks because of the risk for intermittent epidemics. Medical professionals who work for medical institutions are required to report cases to the local public health office. Reported data are reviewed by the local health center staff and submitted to the health authority of the province and Korea Centers for Disease Control and Prevention through an electronic reporting system (*4*). However, despite the law, the reporting rate of infectious disease by medical institutions has been low. Assessing the sensitivity of this reporting system for detecting scarlet fever cases was the goal of this report.

South Korea has a single-payer public health insurance system with universal coverage; the National Health Insurance Service is the insurer, and the Health Insurance Review and Assessment Service (HIRA) reviews payments. Using HIRA data, institutions can obtain information on the diagnoses of diseases and treatments for the entire population (*5*).

According to HIRA data, 14,550 patients in 2011 and 15,533 patients in 2013 had scarlet fever diagnoses (International Statistical Classification of Disease and Related Health Problems, Tenth Revision code A38) (online Technical Appendix Table 1, https://wwwnc.cdc.gov/EID/article/24/1/17-1027-Techapp1.pdf). The number of scarlet fever cases decreased in the following 2 years and then increased again in 2016 to 13,261 cases (*6*). However, according to the NNID surveillance data, 406 cases of scarlet fever were reported in 2011, with the number of cases increasing with time, ending with 11,911 cases in 2016 (Figure), and most patients being young (<10 years of age; online Technical Appendix Table 2) (*7*). The inconsistencies between these 2 databases indicates that the number of in-hospital diagnoses of scarlet fever has been roughly constant, but the reporting rate of diagnosed scarlet fever increased markedly from 2.8% in 2011 to 89.8% in 2016.

Patients with NNIDs fall into the following 3 categories: confirmed case-patient, a person with compatible clinical symptoms who was positive for a group A *Streptococcus* by laboratory tests; suspected case-patient, a person with compatible clinical symptoms who was not tested or not positive for the pathogen by laboratory tests; and pathogen carrier. In South Korea, the reporting criteria for scarlet fever were limited to confirmed case-patients until September 2012, after which the criteria expanded to include suspected case-patients. This change contributed to the sharp increase of reported scarlet fever cases in the South Korea NNID database in 2013. This sharp increase was also facilitated by another factor: medical institutions and government agencies were aware of the poor NNID reporting rate and made efforts to improve them around this time. In a previous study, the incidence of scarlet fever in South Korea was reported to have increased rapidly on the basis of NNID data (*3*). However, considering the background of the reporting system, we believe that HIRA data, rather than the NNID database, better reflect the rate of infection in South Korea.