To the Editor: Hepatitis E virus (HEV) is transmitted through the fecal-oral route and is a common cause of viral hepatitis in developing countries. HEV outbreaks have been documented among forcibly displaced persons living in camps in East Africa, but for >10 years, no cases were documented among Somali refugees (1,2). On August 15, 2012, the US Centers for Disease Control and Prevention (CDC) in Nairobi, Kenya, was notified of a cluster of acute jaundice syndrome (AJS) cases in refugee camps in Dadaab, Kenya. On September 5, a CDC epidemiologist assisted the United Nations High Commissioner for Refugees (UNHCR) and its partners in assessing AJS case-patients in the camp, enhancing surveillance, and improving medical management of case-patients. We present the epidemiologic and laboratory findings for the AJS cases (defined as acute onset of scleral icterus not due to another underlying condition) identified during this outbreak.

Dadaab refugee camp is located in eastern Kenya near the border with Somalia. It has existed since 1991 and is the largest refugee camp in the world. Dadaab is composed of 5 smaller camps: Dagahaley, Hagadera, Ifo, Ifo II, and Kambioos. As of December 2012, a total of 460,000 refugees, mainly Somalis, were living in the camps; >25% were recent arrivals displaced by the mid-2011 famine in the Horn of Africa (3). Overcrowding and poor sanitation have led to outbreaks of enteric diseases, including cholera and shigellosis (4); in September 2012, an outbreak of cholera occurred simultaneously with the AJS outbreak.

During July 2–November 30, 2012, a total of 339 AJS cases were reported from the camps and 2 nearby villages: 232 (68.4%) from Ifo II, 57 (16.8%) from Kambioos, 26 (7.7%) from Ifo, 12 (3.5%) from Dagahaley, 10 (3.0%) from Hagadera, and 1 each (0.6%) from the nearby Kenyan villages of Biyamadow and Darkanley. The epidemic curve of the outbreak is shown in the Figure.

Of the 339 AJS case-patients, 184 (54.3%) were female. The overall median age was 23.5 years (range 1 month–91 years). The median age among female and male residents was 24 years and 20 years, respectively. Among the 134 women of reproductive age (15–49 years), 72 (53.7%) reported being pregnant; the median gestational age was 17.4 weeks (range 8.7-35.3 weeks). Death was reported for 10 of the 339 case-patients (case-fatality ratio 2.9%), 9 of whom were postpartum mothers (case-fatality ratio 12.5%) and 1 a 2-year-old child.

Serum samples were obtained from 170 (50.1%) AJS case-patients for testing at the Kenya Medical Research Institute/CDC laboratories in Nairobi, Kenya. Of the 170 samples, 148 were tested for hepatitis E virus (HEV) IgM by using an ELISA.
HEV transmission and HEV-associated deaths in this region, including the role of person-to-person transmission. UNHCR and CDC investigations of HEV outbreaks in refugee camps in southern Sudan may provide data to answer these questions.

HEV is believed to have infected humans for centuries (9); however, the reemergence of the disease in refugee camps is a major concern because of the difficulty in implementing effective preventive measures under camp conditions. Point-of-care tests will be useful for rapidly detecting outbreaks and could potentially save lives. The progress made in developing effective vaccines is encouraging (10). Once available, HEV vaccination should be prioritized in this population, especially for pregnant women.

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References

1. Howard CM, Handzel T, Hill VR, Grytdal SP, Blanton C, Kamili S, et al. Novel risk factors associated with hepatitis E virus infection in a large outbreak in northern Uganda: results from a case-control study and environmental analysis. Am J Trop Med Hyg. 2010;83:1170–3. http://dx.doi.org/10.4269/ajtmh.2010.10-0384

2. Krawczynski K. Hepatitis E. Hepatology. 1993;17:932–41. http://dx.doi.org/10.1002/hep.1840170525

3. United Nations High Commissioner for Refugees. East Horn of Africa update. Somali displacement crisis at a glance. Geneva: The Commission; 2011.

4. Tepo AK, Oyier FO, Mowld SA, Auko E, Ndege I, Hassine AA, et al. On-site stool culture capacity offers first glimpse at bacterial pathogens causing diarrheal disease in remote refugee camp in Kenya. In: Program and abstracts book of the International Conference on Emerging Infectious Diseases. 2012. p. 88 [cited 2012 Jan 26]. http://wwwnc.cdc.gov/cid/pdfs/ICEID2012.pdf

5. Panda SK, Thakral D, Rehman S. Hepatitis E virus. Rev Med Virol. 2007;17:151–80. http://dx.doi.org/10.1002/rmv.522

6. Piper-Jenkins N, Horowitz HW, Schwartz E. Risk of hepatitis E infection to travelers. J Travel Med. 2000;7:194–9. http://dx.doi.org/10.1002/1468-1774.000059

7. Médecins sans Frontières. Dadaab: reduction of aid activities may have dramatic consequences on refugees. ReliefWeb. 2011 Nov 25 [cited 2012 Dec 1]. http://reliefweb.int/report/kenya/dadaab-reduction-aid-activities-may-have-dramatic-consequences-refugees

8. Bile K, Issa A, Mohamud O, Allebeck P, Nilsson L, Norder H, et al. Contrasting roles of rivers and wells as sources of drinking water on attack and fatality rates in a hepatitis E epidemic in Somalia. Am J Trop Med Hyg. 1994;51:466–74.

9. Purdy MA, Khudyakov YE. Evolutionary history and population dynamics of hepatitis E virus. PLoS ONE. 2010;5:e14376. http://dx.doi.org/10.1371/journal.pone.0014376

10. Zhu F-C, Zhang J, Zhang X-F, Zhou C, Wang Z-Z, Huang S-J, et al. Efficacy and safety of a recombinant hepatitis E vaccine in healthy adults: a large-scale, randomised, double-blind placebo-controlled, phase 3 trial. Lancet. 2010;376:895–902. http://dx.doi.org/10.1016/S0140-6736(10)6030-6
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Wild Poliovirus Importation, Central African Republic

To the Editor: Since the Global Polio Eradication Initiative was launched in 1988, indigenous transmission of wild poliovirus (WPV) has been interrupted in all countries except Afghanistan, Pakistan, and Nigeria (1). However, during 2003–2011, outbreaks resulting from importation of WPV occurred in 29 previously polio-free countries in Africa, including Central African Republic (CAR) (1–3). In 2011, 350 WPV cases were reported from 12 countries in Africa, a 47% decrease from the 657 cases reported by 12 countries in Africa in 2010 (1).

In CAR, the last case of poliomyelitis caused by indigenous transmission of wild poliovirus was reported in 2000, but importation of WPV type 1 has been reported (4). We describe the importation of WPV1 and WPV3 into CAR during successive events in 2008, 2009, and 2011.

To investigate importation of WPV into CAR, we conducted a study using fecal samples collected from patients in CAR who had acute flaccid paralysis (AFP) during 2008–2011. The samples were analyzed for virus isolation, typing, and intratypic differentiation at the Regional Reference Laboratory for Polio, Institut Pasteur de Bangui, using World Health Organization (WHO) standard procedures (5). Isolated WPV strains were sent to the Centers for Disease Control and Prevention (Atlanta, Georgia, USA) or the National Institute for Communicable Diseases (Johannesburg, South Africa) for sequencing according to WHO guidelines (6–8). Cases were classified as laboratory confirmed or polio-compatible according to WHO recommendations; a polio-compatible case was defined as AFP for which stool samples were not adequate or a situation in which the patient was lost to follow up or had residual paralysis 60 days after testing.

Of 141 AFP cases from 2008, three, from Bangui, Ouham, and Ouaka districts, were laboratory confirmed as WPV1; this cluster was designated B2D1B (Figure). Sequencing results showed that the virus in this cluster belonged to the South Asia A (Indian) genotype, which was circulating in Angola and Democratic Republic of Congo at that time (Figure).

Of 163 AFP cases from 2009, 14 in Ouham-Pende district were laboratory confirmed as WPV3; this cluster was designated D2B2B1. Sequencing results showed that the virus in this cluster belonged to West Africa B genotype, which was circulating in Nigeria and southern Chad at that time (Figure).

Of 142 AFP cases from 2011, four in Ouham district were laboratory confirmed as WPV1; this cluster was designated I6C2B4C1A2. Sequencing results showed that the virus in this cluster belonged to West Africa B genotype, which was circulating in south Chad and Nigeria at the time (Figure).

The importation of wild poliovirus strains into CAR appeared to follow 3 different routes. In 2008, WPV1 originated from Democratic Republic of Congo and was first detected in the capital, Bangui, which is located in

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1Data from this report were presented to the Global Polio Laboratory Network, Geneva, Switzerland, and at the First International Conference of the African Society of Laboratory Medicine, 2012 Dec 1–7, Cape Town, South Africa.