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Viral Hepatitis E Outbreaks in Refugees and Internally Displaced Populations, sub-Saharan Africa, 2010–2020

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Hepatitis E virus is a common cause of acute viral hepatitis. We analyzed reports of hepatitis E outbreaks among forcibly displaced populations in sub-Saharan Africa during 2010–2020. Twelve independent outbreaks occurred, and >30,000 cases were reported. Transmission was attributed to poor sanitation and overcrowding.

Hepatitis E virus (HEV) is a common etiology of acute viral hepatitis worldwide (*1*). Large-scale, often protracted outbreaks caused by HEV infection in refugee and internally displaced person (IDP) settlements and camps have occurred (*1*), particularly in sub-Saharan Africa, a region with nearly one third of the global forcibly displaced population (*2*). Previous epidemiologic studies of HEV infections in forcibly displaced persons have focused on singular events (*3*,*4*). The objective of this study was to identify trends in HEV outbreaks among forcibly displaced populations in sub-Saharan Africa.

We conducted a focused review of all English-language curated reports posted on ProMED-mail (ProMED) during 2010–2020 concerning HEV in forcibly displaced populations in sub-Saharan Africa. ProMED uses formal and informal disease surveillance mechanisms to rapidly report emerging disease events in animals, humans, and plants globally (*5*). It has been validated as a rapid and accurate tool for determining and describing global outbreaks. We verified all reports via PubMed, ReliefWeb, the UN High Commission for Refugees, World Health Organization (WHO), and references secondarily collected from ProMED. We used the keyword "hepatitis E" in applicable search engines for reports published during 2010–2020. We included records documenting "refugee(s) and/or asylum seeker(s) and/or internally displaced person(s)" in sub-Saharan Africa as defined by the World Bank (*6*). We considered outbreaks unique on the basis of date and location of cases. When screening ProMED reports, we used the most recent report pertaining to an outbreak. In cases where discrepancies existed between data sources reporting on the same outbreak, we retained the higher number of case counts. Three independent investigators (A.D., B.L., and A.M.) manually reviewed the databases.

Twelve hepatitis E outbreaks among forcibly displaced persons resulting in a total of >30,000 suspected or confirmed cases of acute HEV and ≥610 deaths were reported during 2010–2020 (Appendix Table, https://wwwnc.cdc.gov/EID/article/28/5/21-2546-App1.pdf). Outbreaks occurred in Sudan, South Sudan, Ethiopia, Chad, Niger, Namibia, Burkina Faso, Kenya, and Nigeria (Figure). One outbreak in displaced persons in South Sudan's Bentiu camp for

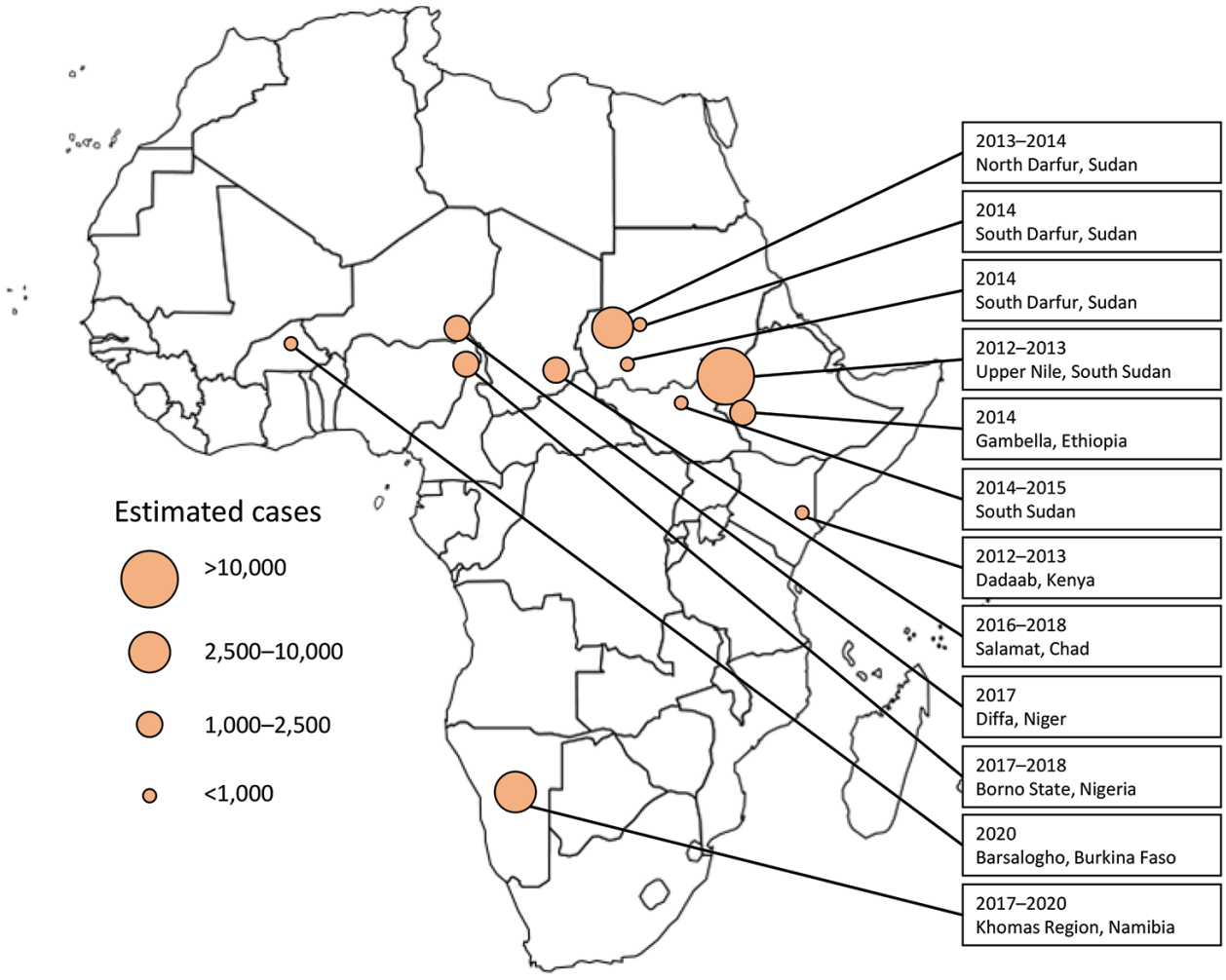

Figure. Geographic distribution of acute hepatitis E virus outbreaks reported among displaced persons in sub-Saharan Africa, 2010–2020.

internally displaced persons that included >1,000 cases since 2019 was not included in this analysis because it continued beyond 2020. The largest outbreak of acute HEV infections (>11,000 cases) was reported in a protracted outbreak in the Upper Nile, South Sudan, during July 2012–October 2013, among persons fleeing violence in Sudan in 2011. The most common contributors to hepatitis E outbreaks reported were overcrowding, poor sanitation, and flooding.

Prior studies have demonstrated the proclivity of HEV transmission in settings such as refugee and IDP camps; close quarters, inadequate sanitation and hygiene, and the constant introduction of new, susceptible persons into camps provided the conditions necessary for forward transmission (*3*,*4*). We could not calculate accurate case-fatality rates given the uncertainty surrounding the total number of true cases and deaths reported. Population-based studies during disease outbreaks of hepatitis E have placed mortality rates at 0.07%–0.6%; we noted substantial variability particularly for high-risk populations such as pregnant women (*1*). Cases and fatalities in pregnant women were reported for 3 hepatitis E outbreaks in this series: 2 reported deaths among 18 cases in pregnant women in Ethiopia (2014); 17 reported deaths in pregnant women in Niger (2017), comprising 45% of the recorded deaths in that outbreak; and 12 reported deaths in pregnant women in Namibia (2019).

The first limitation of this study is that case definitions may vary between settings, and confirmatory testing was not always reported. Second, mild and asymptomatic cases are often unreported, and the relatively long incubation period for HEV infection may hinder diagnosis and reporting. Third, misclassification bias is possible, especially because many of the settings are endemic for other causes of acute jaundice syndrome, such as malaria and yellow fever, and diagnostic testing was infrequent. Those factors also limited our ability to conduct a pooled analysis on the data.

Despite these limitations, this study demonstrates the high potential for HEV to cause outbreaks in communities with recently displaced persons. Of note, all of the reported outbreaks in this study occurred in the context of highly crowded camps or settlements, supporting the association between hepatitis E outbreaks and those environments. Given that some of the outbreaks noted in this analysis appeared to cross national borders, genetic sequencing to validate related strains may be useful for disease surveillance and prevention efforts. Additional data are needed to evaluate the potential utility of HEV vaccination in outbreaks and the barriers to vaccinating residents of refugee and IDP settlements. Water, sanitation, and hygiene measures are critical to reducing disease outbreaks, as is improved cross-border communication to prevent and manage future outbreaks. Clinicians and relief staff working with displaced populations should be vigilant for signs of hepatitis E disease, particularly among high-risk hosts such as pregnant women. Resources must be devoted to improving HEV surveillance, diagnostic capabilities, and response efforts for refugee and displaced populations.

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About the Author

Dr. Desai is an infectious disease physician and researcher whose primary focus is the application of informal surveillance methods for displaced populations, as well as for emerging and reemerging infectious disease threats.

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Usutu Virus Africa 3 Lineage, Luxembourg, 2020

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We detected Usutu virus in a dead Eurasian blackbird (*Turdus merula*) in Luxembourg in September 2020. The strain clustered within the Africa 3.1 lineage identified in Western Europe since 2016. Our results suggest maintenance of the virus in Europe despite little reporting during 2019–2020, rather than a new introduction.

West Nile virus (WNV) and Usutu virus (USUV), members of the family *Flaviviridae*, share several epidemiologic traits and cocirculate in Europe. Both viruses are maintained through a transmission cycle involving bird and mosquito vectors. Migratory birds likely play a role in long-distance spread of USUV, similarly to WNV, and in the recent introduction of the virus to Europe from Africa (*1*).

In Europe, USUV has been associated with bird dieoff events since 2001 (*2*) and seems notably pathogenic for passerines and owls (*3*). Massive dieoff

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Viral Hepatitis E Outbreaks in Displaced Populations, Sub-Saharan Africa, 2010–2020

Appendix

Appendix Table. Published reports for outbreaks of viral hepatitis E in sub-Saharan Africa, 2010–2020

Region and country	Site (pop.)	Year	No. suspected cases (time period)	Confirmatory testing in select cases	No. deaths*	References
Upper Nile, South Sudan	Maban County (110,000)	2012–2013	>11,000 (Jul 2012–Oct 2013)	Yes, PCR and rapid antibody testing	241	CDC (*3*)
						ProMed (*12*)
Garissa County, Kenya	Dadaab (460,000)	2012–2013	339 (Jul–Nov 2012)	Yes, PCR and ELISA antibody testing	10	Ahmed et al. (*4*)
North Darfur, Sudan	El Sareif (59,000)	2013–2014	2,572 (Jan 2013–Feb 2014)	Not available	34	ProMed (*13*)
South Darfur, Sudan	Nyala (90,000)	2014	628 (Jan–Sep 2014)	Yes, testing modality not specified	150	OCHA (*5*)
						ProMed (*14*)
Gambela, Ethiopia	Leichuor, Kule, Tierkidi (143,000)	2014	1,117 (Apr 2014–Jan 2015)	Yes, PCR and rapid antibody testing	21	Browne et al. (*1*)
						ProMed (*15*)
South Sudan	Bentiu, Mingkamen, Lankien (200,000)	2014–2015	729 (Aug 2014–Aug 2015)	Yes, PCR and ELISA antibody testing	4	WHO (*6*)
						ProMed (*16*)
North Darfur, Sudan	Sortony (21,000)	2016	134 (May–Jul 2016)	Yes (testing modality not specified)	Not reported	OCHA (*7*)
						ProMed (*17*)
Salamat, Chad	Am Timan, Aboudeia, Amsinéné, Mouraye, Foulonga	2016–2018	1,874 (Aug 2016–Jan 2018)	Yes (testing modality not specified)	23	WHO Africa Regional Office (*8*)
						ProMed (*18*)
Lake Chad Basin, Niger	Diffa (240,000)	2017	1,917 (Jan–Sep 2017)	Yes (PCR and ELISA antibody testing)	38	Lagare et al. (*2*)
						ProMed (*19*)
Lake Chad Basin, Nigeria	Borno State (1.4 million)	2017–2018	1,815 (Feb 2017–Feb 2018)	Yes (ELISA antibody testing)	8	Nigeria Centre for Disease Control (*10*)
						ProMed (*20*)
Namibia	Windhoek, Khomas region†	2017–2020	7,457 (Oct 2017–Mar 2020)	Yes (antibody testing)	65	WHO Africa Regional Office (*9*)
						ProMed (*21*)
North Central Region, Burkina Faso	Barsalogho District (99,000)	2020	442 (Jul–Nov 2020)	Yes (PCR)	16	WHO (*11*)

Region and country	Site (pop.)	Year	No. suspected cases (time period)	Confirmatory testing in select cases	No. deaths*	References
						ProMed (*22*)

*Totals include suspected and confirmed deaths.
†Most cases were reported from informal settlements within the capital district Windhoek, though by April 2018 the outbreak involved other surrounding regions as well. The cases reported here are a summary of the entire series of outbreaks.

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