



## Emerging and reemerging epidemic-prone diseases among settling nomadic pastoralists in Uganda



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### ABSTRACT

Epidemic-prone diseases have traditionally been uncommon among nomadic pastoralists as mobility allows already dispersed populations to migrate away from epidemic threats. In the Karamoja region of Uganda, nomadic pastoralists are transitioning to an increasingly settled lifestyle due to cattle raiding and associated civil insecurity. In attempts to reduce conflict in the region, the Ugandan government has instituted disarmament campaigns and encouraged sedentism in place of mobility. In Karamoja, this transition to sedentism has contributed to the emergence and reemergence of epidemic-prone diseases such as cholera, hepatitis E, yellow fever, and meningococcal meningitis. The incidence of these diseases remains difficult to measure and several challenges exist to their control. Challenges to communicable disease surveillance and control among settling nomadic pastoralists are related to nomadic mobility, remote geography, vaccination and immunity, and poor sanitation and safe water access. In addition to improving gaps in infrastructure, attracting well-trained government health workers to Karamoja and similar areas with longstanding human resource limitations is critical to address the challenges to epidemic-prone disease surveillance and control among settling nomadic pastoralists. In conjunction with government health workers, community health teams provide a sustainable method by which public health programs can be improved in the austere environments inhabited by mobile and settling pastoralists.

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Abbreviations: UMOH, Uganda Ministry of Health; UNEPI, Uganda National Expanded Program on Immunization; VHT, village health team; RDT, rapid diagnostic test.

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## 1. Introduction

Nomadic pastoralists in sub-Saharan Africa have traditionally been relatively unaffected by epidemic-prone diseases as already dispersed nomadic populations migrate away from epidemic threats (Sheik-Mohamed and Velema, 1999; Omar, 1992; Loutan and Paillard, 1992). In the Karamoja region of northeastern Uganda, where livelihoods have customarily been maintained through nomadic pastoralism, epidemic-prone diseases were historically uncommon (Fig. 1). However, over the past decade, the region has been affected by multiple outbreaks of communicable diseases. In 2010 and 2011, large cholera outbreaks occurred in several districts in Karamoja (Cummings et al., 2012). From 2009 to 2012, Karamoja was affected by an outbreak of hepatitis E, the first in the region, with over 1500 suspected cases recorded (Uganda Ministry of Health [UMOH], unpublished data). In 2010, yellow fever reemerged in Uganda and greater than 40% of the subsequent cases were located in Karamoja (Wamala et al., 2012). Although outbreaks of meningococcal meningitis had occurred in Karamoja in the mid-1990s, all were small and due to *Neisseria meningitidis* serogroup A (UMOH, unpublished data). Between 2005 and 2007, recurrent outbreaks occurred in three districts in Karamoja, including several due to *N. meningitidis* serogroup X, marking the emergence of serogroup X in Uganda.

Largely due to the consequences of endemic violence linked to cattle raiding, livelihoods in Karamoja have begun to shift from those dominated by nomadic animal herding and mobility to those incorporating sedentism (Stites and Akabwai, 2009; Stites and Akabwai, 2012). With a rise in settlement in overcrowded communities, limited immunity to certain epidemic-prone diseases amongst the population, and poor sanitation and safe water infrastructure, a need exists to prevent and control the emergence and reemergence of epidemic threats to public health in Karamoja and other regions of sub-Saharan Africa where nomadic pastoralists continue to settle. Herein, we discuss the traditional burden of epidemic-prone diseases among nomadic pastoralists, discuss the forces driving settlement of a formerly nomadic population, and describe the emergence and reemergence of cholera, hepatitis E, meningococcal meningitis, and yellow fever in Karamoja, Uganda. We then proceed to highlight the challenges faced by

communicable disease control programs among settling nomadic pastoralists and routes by which such programs can be improved.

## 2. Epidemic-prone diseases among nomadic pastoralist populations in sub-Saharan Africa

Despite having limited access to quality water, safe sanitation, and appropriate vaccine coverage, nomadic pastoralists throughout Sub-Saharan Africa have infrequently experienced outbreaks of typical epidemic-prone diseases such as cholera and measles. It has been proposed that as nomadic pastoralists often live in isolated communities, are highly mobile, and often disperse with their animals, the transmission of communicable diseases among such populations is low (Sheik-Mohamed and Velema, 1999; Omar, 1992; Loutan and Paillard, 1992). For example, investigations from West and East Africa have reported nomadic pastoralists using mobility to avoid areas affected by measles outbreaks and moving to highlands to avoid arthropod vectors (Sheik-Mohamed and Velema, 1999; Loutan and Paillard, 1992; Prothero, 1994; Kloos, 1990).

Published literature reporting the quantitative incidence and prevalence of epidemic-prone diseases among nomadic pastoralists is limited, with most prior investigations evaluating measles (Loutan and Paillard, 1992; Anderson and Mufson, 1972; Schelling et al., 2005). The mobile nature of nomadic pastoralist livelihoods and the remote and volatile environments in which they reside have presented challenges to the systematic collection of public health data and the execution of prospective epidemiological studies. Most available data relies on the results of small, retrospective cross-sectional and descriptive investigations. Among the available studies on epidemic-prone diseases, a 1992 serosurvey from Niger investigating the transmission of measles showed that nearly 60% of 202 Toureg nomad children less than 10 years of age had no serological evidence of prior measles infection (Loutan and Paillard, 1992). A prior serological investigation of measles among Turkana pastoralists in Kenya who had recently settled found similarly low prevalence of infection (Anderson and Mufson, 1972). Regarding cholera, pastoralists in Mali were reported to be relatively unaffected by the early waves of the seventh cholera pandemic in 1970–1971 due to their geographic isolation in the northern parts of the country where they remained with their animals (Prothero, 1994). A descriptive study on the health of nomadic pastoralists in the Sahel region of Chad in 1999–2000 identified no cases of cholera among nomads during their period of investigation, despite an ongoing cholera epidemic among other populations in the investigators' geographic zone of study (Schelling et al., 2005). Similarly, lower rates of intestinal helminth and parasitic infections have been reported among nomadic versus settled pastoralist populations in Somalia (Iardi et al., 1987).

Although there may be concern for poor disease surveillance leading to lower reported rates of epidemic-prone diseases in nomadic pastoralist settings in the past, recently available data from Uganda has shown that the percentage of health facilities in the Karamoja region submitting yearly nationally standardized surveillance reports was 81.8%, compared to a national average of 86.5% (Ministry of Health, 2012). In addition, in the abovementioned serological study on measles from Niger, the sensitivity and specificity of caregivers reporting an accurate history of measles (using serology as the gold standard) was relatively high (>75% and >90%, respectively) (Loutan and Paillard, 1992). This suggests that caregivers were able to accurately report the disease, aiding in case identification during the surveillance program.

Although most classic epidemic-prone diseases have been relatively uncommon among nomadic pastoralists, many nomadic pastoralists reside in the sub-Saharan “meningitis belt” and are

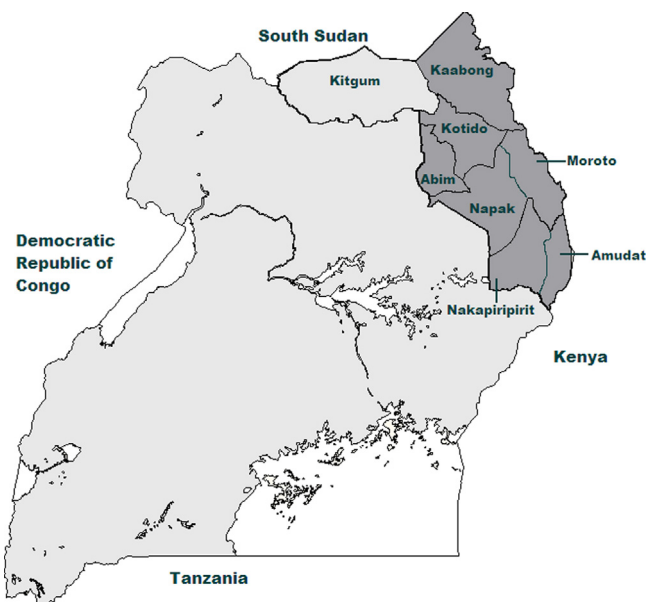


Fig. 1. Map of Uganda. The seven districts of the Karamoja region are represented by gray shading. Kitgum District is outlined in medium strong line.

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