



## The puzzle of Buruli ulcer transmission, ethno-ecological history and the end of “love” in the Akonolinga district, Cameroon



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### ABSTRACT

The “One World One Health Initiative” has attended little to the priorities, concepts and practices of resource-poor communities confronting disease and the implications of these concerns for its biomedical, ecological and institutional approach to disease surveillance and control. Using the example of Buruli ulcer (BU) and its bacterial etiology, *Mycobacterium ulcerans*, in south-central Cameroon, we build on debates about the contributions of “local knowledge” and “alternative models” to biomedical knowledge of disease transmission. BU’s mode of transmission remains poorly understood. Our approach employs ethno-ecological histories – local understandings of the putative emergence and expansion of a locally important, neglected disease. We develop these histories from 52 individual and small group interviews, group discussions, and participant-observation of daily and seasonal activities, conducted in 2013–2013. These histories offer important clues about past environmental and social change that should guide further ecological, epidemiological research. They highlight a key historical moment (the late 1980s and 1990s); specific ecological transformations; new cultivation practices in unexploited zones that potentially increased exposure to *M. ulcerans*; and ecological degradation that may have lowered nutritional standards and heightened susceptibility to BU. They also recast transmission, broadening insight into BU and its local analog, *atom*, by emphasizing the role of social change and economic crisis in its emergence and expansion.

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Taking as its central problematic the interconnections between human, animal, and ecosystem health, the “One World One Health Initiative” envisions “a world capable of preventing, detecting, containing, eliminating and responding to animal and public health risks” from zoonotic and vector-borne diseases through multi-disciplinary, -sectoral, and -institutional collaborations (FAO-OIE-WHO Collaboration, 2010). Its embrace of multi-disciplinarity promises to generate “benefits to poor communities...by reducing the risks of infectious diseases that are important locally”, particularly “neglected” diseases (FAO/OIE/WHO/UNICEF/JN System Influenza Coordination/World Bank, 2008, p. 6). Yet attention to what “poor communities” think about locally significant diseases occupies little space in One Health documents. Missing is a concerted attention to the priorities, concepts and practices of

communities confronting such diseases – the preoccupation of some qualitative social sciences – and to how such concerns mesh with its biomedical, ecological and institutional approach to disease surveillance and response.

This essay demonstrates that ethno-ecological history – local understandings of the putative emergence and expansion of a locally significant disease – offers an “alternative model” of transmission (Leach and Scoones, 2013) and important clues about past environmental and social change that should guide further ecological, biomedical research. We focus on Buruli ulcer (BU), an endemic illness in the Akonolinga district of south-central Cameroon, caused by the environmental bacteria *Mycobacterium ulcerans*, which necrotizes skin and subcutaneous tissue and can lead to chronic, disfiguring ulcers and long-term disability. Designated by the World Health Organization (WHO) (2012) as an “infectious disease of poverty”, it has been detected in 32 countries throughout the world, including those in equatorial and west Africa, the Pacific, Asia and Latin America. But much about its ecology, biology and historical epidemiology remains unknown.

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Transmission is associated with stagnant waters and environmental transformations, and biting aquatic insects and mosquitoes are possible vectors. The first epidemiological studies in the Akonolinga district were conducted after 2000, so when the disease first emerged is uncertain (Porten et al., 2009; Pouillot et al., 2007). Early detection and treatment is currently the sole effective intervention. As a WHO-designated “neglected” and possibly vector-borne disease linked to environmental exploitation and change, BU could be a candidate for a One Health approach (WHO, 2012).

How would this approach facilitate better understanding of BU transmission? What could perspectives of resource-poor communities living with BU contribute to understandings of transmission? This question evokes long-standing debates concerning the contributions of “local knowledge” to scientific investigation. Helen Tilley (2011) argues that anthropological preoccupations with “vernacular sciences” of medicine, botany, and agriculture date to the mid-19th century, the result of the globalization of field sciences and European colonization, but also anthropology’s professionalization and the use of ethnographic research to support colonial state interventions (p. 26). Late colonial conceptions of disease ecology – an intellectual ancestor of One Health – bore important influences of African “vernacular knowledge”, although such influences were subsequently forgotten (Tilley, 2011, pp. 201–16, 316–17).

Contemporary preoccupations with and marginalization of “indigenous” or “local knowledge” are nothing new, nor are questions about how such knowledge can aliment biomedical, ecological investigation. A voluminous literature urges its incorporation into epidemic and environmental management, biodiversity protection and development interventions (Hewlett and Hewlett, 2008; Berkes, [1999] 2008; Sillitoe, 1998). It has undergone significant critique for its use of the term “indigenous”, evolutionary assumptions, suppositions of stasis and insularity, and emphasis on “formal, cognitively based schemas or mental models” (Lauer and Aswani, 2009, pp. 317–18, citing Ingold, [2000] 2011; Gagnon and Berteaux, 2009; Giles-Vernick, 2002; Agrawal, 1995). Leach and Scoones (2013) usefully reframe these debates in terms of “participatory models” to illuminate how people living with certain illnesses understand ecological and social changes that catalyze epidemics, and to highlight the multiple, interacting dynamics overlooked by other kinds of models. Recognizing that powerful biomedical sciences can marginalize social sciences and “local knowledge and cultural logics”, they criticize the One Health aim of “integration” and “interdisciplinarity”. Instead, they argue for the “triangulation” of diverse models, which “highlight different things, and are based on different assumptions, world views and sources of information”, to capture the complexity of human-ecology–disease interactions (Leach and Scoones, 2013, p. 16).

Building on these insights, we argue that an ethnohistorical approach, eliciting ecological, social and political economic recollections of inhabitants of two Akonolinga district villages can enrich understandings of *M. ulcerans* transmission and BU epidemiology in two ways. First, people participating in ecological and social changes and political economic processes offer fine-grained observations of changing field, riverine and forest ecologies and exploitation practices. Their transformation and cultivation of seasonally flooded forests from the 1980s to supply developing regional food markets and to compensate for declining cocoa income pinpoints specific ecological zones and practices that may have increased exposure to *M. ulcerans*. Such claims transcend biomedical researchers’ vague references to past “deforestation”, ecological zones and practices, and thus should guide further investigation into transmission and possible expansion.

Second, local historical narratives of BU emergence underscore social changes that biomedical investigations of transmission miss entirely. Inhabitants frequently contend that “love is finished” when detailing the social ruptures and attendant economic and ecological changes in their villages and district over the past four decades. “Love” (*eding*) is a cohesive social relation catalyzing acts of material support for families, kin groups and communities; it manifests itself in fruitful productive and extractive ecological activities. Referring to BU as *atom*, a local diagnostic category designating certain “incurable wounds”, our informants contended that this illness had multiple etiologies, some of which are “thrown” by manipulating supernatural forces (Peeters Grietens et al., 2012). *Atom* is one expression of ruptured social relations undergirding ecological decline and economic hardship from the late 1980s. These narratives, highlighting broader processes that manifest as illness, demonstrate concretely the contributions of alternative historical models and ethno-ecological history to multi- and interdisciplinary studies of disease transmission.

This essay first evaluates ecological, epidemiological investigations of the *M. ulcerans* transmission puzzle. After addressing south-central Cameroon’s political ecological history, it analyzes ethno-ecological histories recounted by Ekugu and Abem inhabitants, pinpointing changes that possibly galvanized BU expansion and underscoring social ruptures that gave rise to the end of “love”, ecological decline and the emergence of *atom*, BU’s analog. It concludes by arguing that in investigations of poorly understood diseases like BU, One Health needs both multi- and interdisciplinary investigation. Genuine multi- and interdisciplinarity, however, cannot be institutionalized by global health agencies. An urgent health problem and concrete, project-based collaborations provide the grounds to enrich scientists’, social scientists’ and poor communities’ quests to unravel public health puzzles.

## 1. Methods

This essay’s central problematic – the contributions of resource-poor communities and social sciences to biomedical and ecological studies of BU, is integrated into its methodology. This ethnohistorical study is part of an ongoing multi-disciplinary investigation that seeks to identify BU expansion and transmission in the Akonolinga health district of the Nyong-et-Mfoumou department, in Cameroon’s Centre Region. The district was selected for investigation because of BU endemicity and biomedical investigators’ previous research experience there.

Giles-Vernick and Owona-Ntsama, assisted by Joachim Ossomba, conducted field research during trips in May 2012 and January and September 2013. We focused our ethnographic, historical research in the village of Ekugu (pop. 433), located along a less-traveled secondary track in the Akonolinga district, with additional research in Abem (pop. 757), situated on an unpaved district road. Between 2002 and 2012, both villages demonstrated “medium–high” BU prevalence compared to other district villages (Centre Pasteur, unpublished data, 2013). We limited our research to two villages to facilitate in-depth understanding of daily practices, ecologies, and kinship networks of long-term inhabitants.

We employed several methods: in-depth interviews, informal discussions, group interviews, mapping exercises, and participant-observation. We pursued 22 semi-structured, individual interviews with 18 parents, healers, and village and regional chiefs on the etiologies and treatment of *atom*, a local analog of BU. Seventeen were conducted in Ewondo (a dialect of the Bantu language spoken by Beti peoples), recorded, and transcribed and translated into French. We also led 19 long (2+ hours) individual or small group interviews with 28 people on ecological, agricultural and health

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