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Geographical mobility and heterogeneity of the HIV epidemic

Improved HIV surveillance, novel and creative data sources and data collection technologies, and long-term cohort studies help to identify fine-scale geographical heterogeneities in HIV prevalence and incidence. In *The Lancet HIV*, Larry Chang and colleagues¹ document substantial heterogeneities using a population-based cohort study to assess HIV disease burden, sexual behaviours, and treatment and prevention service coverage in Rakai, Uganda. They mapped HIV prevalence and assessed differences in HIV risk factors and uptake of antiretroviral therapy and male circumcision among people in agrarian (n=9931), trading (n=3318), and fishing (n=3870) communities. HIV prevalence ranged from 9% to 43%, with the highest prevalence in Lake Victoria fishing communities.

This persistence of heterogeneity in HIV prevalence four decades since HIV/AIDS emerged in Uganda across communities even within a small geographical area is remarkable. The message is clear: geography affects risk. How and why HIV risk can change so quickly over space and time is less clear, but is probably a result of patterns of human geographical mobility and contextual factors in addition to individual behaviours. To understand and respond to fine-scale heterogeneities, we must consider the social and cultural contexts in which HIV continues to circulate. Rigorous social science theory and research need to be integrated into all stages of the scientific process, from descriptive epidemiological studies to planning, targeting, and implementing HIV prevention efforts in transmission hotspots and most-at-risk populations.^{2,3} In the case of African inland fishing communities, and indeed in most other settings where HIV prevalence is high, we must understand sex-specific patterns of mobility and HIV risk to respond to the epidemic.

The focus of mobility as a factor in risk, spatial diffusion, and transmission dynamics of HIV has changed markedly since the early days of research on male truck drivers.^{4,5} Increasingly, a thorough understanding of how and why mobility patterns are intertwined with HIV risk and transmission patterns over time and space is emerging because of attention paid to sex-specific patterns of mobility and the gendered contexts in which they are embedded.^{6,7} The concentrated HIV epidemic in fishing communities in the Lake Victoria basin provides a rich

context for these advances in research and understanding (figure).⁸⁻¹² The mobility of men who work in the fishing industry is well known, but mobility of women fish traders who circulate between beaches and markets has received less attention.^{8,12} Many people who work in the fish industry also engage in a transactional, so called, fish-for-sex economy in which traders exchange sex with fishermen to gain preferential fish access (termed *Jaboya* in Kenya). Despite stigma surrounding these practices,⁸ declines in the fish population in Lake Victoria continue to foster fish-for-sex relationships, reducing relationship durations and women's bargaining power.¹³

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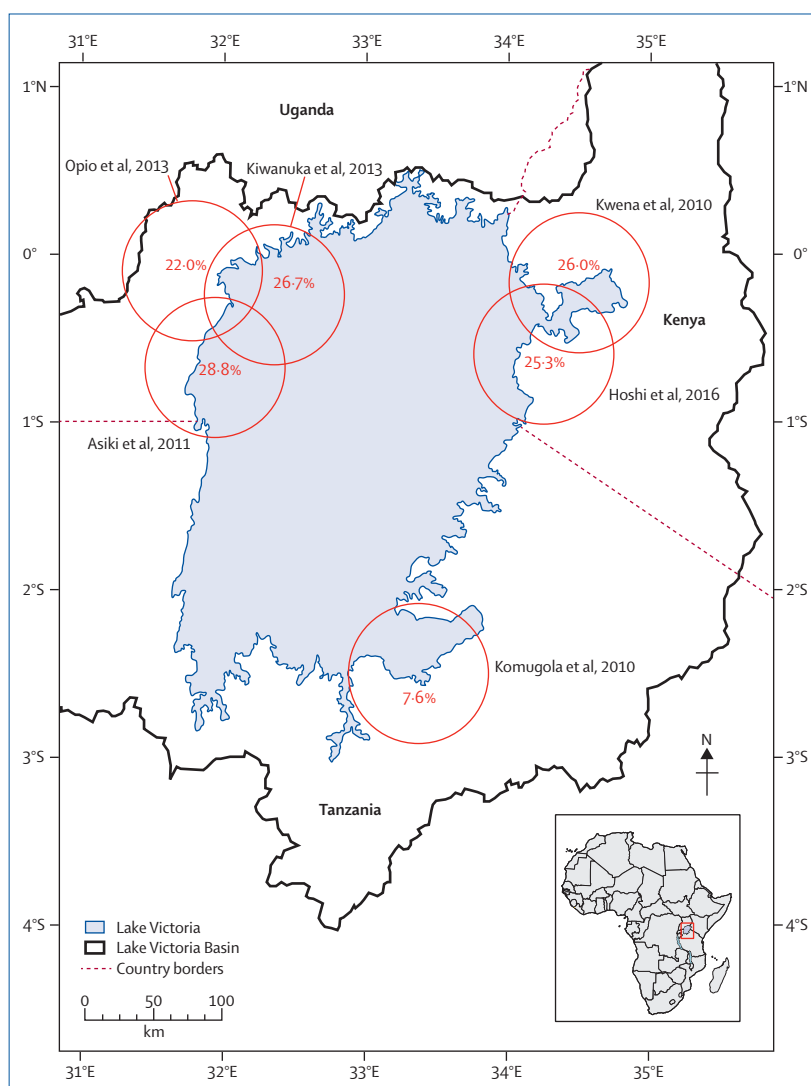


Figure: HIV prevalence in Lake Victoria fishing communities, estimated in several research studies. Map produced by Kevin Mwenda. References are provided in the appendix.



The social climate, in addition to the economic context, also matters; the rural Ugandan lakeshore communities have been described as an urban culture with heavy alcohol consumption and venue-based commercial sex work.^{11,14} The non-kin ties and an associated lack of social monitoring of people who circulate through the beach communities also facilitate higher risk sexual behaviour in these settings.¹¹ As noted by Chang and colleagues¹ and others,¹¹ Lake Victoria fisherfolk are largely untouched by initiatives to increase access to antiretroviral therapies, because of their mobility, distance from services, and other social, economic, and cultural factors. Any interventions to be deployed among fisherfolk must take stock of what is known, via existing and future rigorous social science research, about the unique and complex social dynamics underlying the spread of HIV in these populations and settings.

As global incidence of HIV hopefully continues to decrease, heterogeneities in HIV risk will become even more prominent. The role of human geographical mobility and complex social dynamics will be central in sustaining pockets of HIV transmission, or even foiling prevention or elimination efforts over space and time. More generally, understanding the heterogeneous social and health systems contexts that shape whether and how current and future biomedical interventions work in various settings will be increasingly important. Context matters, because unanticipated factors in real-life contexts can mediate the effects of these interventions and related approaches to HIV prevention and care.² We might as well integrate good social science into our epidemiological research now, so that we can continue to effectively combat HIV at every level.

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