2. Gilquin J, Viard JP, Jubault V, Sert C, Kazatchkine MD. **Delayed occurrence of Graves' disease after immune restoration with HAART.** *Lancet* 1998; **352**:1907–1908.
3. Gomez V, Smith PR, Burack J, Daley R, Rosa A. **Sarcoidosis after antiretroviral therapy in a patient with acquired immunodeficiency syndrome.** *Clin Infect Dis* 2000; **31**:1278–1280.
4. French M. Pathogenesis of immune reconstitution inflammatory syndrome. *Plenary talk to 14th International Conference on Retroviruses and Opportunistic Infections*. Los Angeles, USA; 28 February 2007.
5. Krupica T, Fry TJ, Mackall CL. **Autoimmunity during lymphopenia: a two hit model.** *Clin Immunol* 2006; **120**:121–128.
6. Miller RF, Scully M, Cohen H, Roedling S, Starke R, Edwards SG, Machin SJ. **Thrombotic thrombocytopaenic purpura in HIV-infected patients.** *Int J STD AIDS* 2005; **16**:538–542.
7. Franchini M, Zaffanello M, Veneri D. **Advances in the pathogenesis, diagnosis and treatment of thrombotic thrombocytopenic purpura and hemolytic uremic syndrome.** *Thromb Res* 2006; **118**:117–184; E-pub 29 August 2005.

Characteristics of external/bridge relationships by partner type and location where sexual relationship took place

Coffee *et al.* [1] have recently argued that in rural areas of South Africa 'migration primarily influences HIV spread by increasing high-risk sexual behavior, rather than by connecting areas of low and high risk' (p. 343). Coffee *et al.* [1] model a context in which migration is 'circular': male out-migrants leave their home communities to work in urban areas and occasionally return home. The composition and direction of migration flows may, however, be more complex in other rural regions of sub-Saharan Africa [2]. In some settings, local relationships with temporary in-migrants ('visitors') are not only a common form of sexual partnerships, but may also constitute more efficient bridges for HIV transmission across distant areas than sexual contacts with out-migrants.

Our analyses are based on the Likoma Network Study, a cross-sectional sexual network survey of all adults aged 18–35 years residing in seven villages of Likoma Island on Lake Malawi ($N = 923$) [3,4]. Unique features of this dataset include: (i) identifying all the relationships connecting the sexual networks of Likoma to sexual networks of the mainland (bridge relationships); and (ii) classifying external partners in bridge relationships as either out-migrants, outside partners or visitors. This classification was based on the permanent residence of a sexual partner at the time of the survey, the location (within or outside of Likoma) of the first sexual encounter between a respondent and his or her partner, as well as detailed lists obtained during the Likoma Network Study of migrants having left Likoma during the 5 years before the survey. Out-migrants are sexual partners who are either temporarily absent from their residence on Likoma, or who have permanently left the island during the past 5 years; outside partners never resided on the island but engaged in sexual relationships with a respondent while he or she was traveling outside of Likoma; visitors temporarily sojourned on Likoma and engaged in sexual relationships with a respondent while on the island. In Likoma, visitors typically include relatives, traders from the mainland, as well as soldiers from the Malawian army, civil servants or employees of non-governmental organizations stationed on the island.

We identified 776 ongoing sexual relationships at the time of the survey, of which 175 [22.5%, 95% confidence interval (CI) 19.6–25.6] were with partners residing outside of Likoma (Table 1). There were no sex differences in the probability of having an external partner, but bridge relationships of women were more likely to be marital than those of men [odds ratio (OR) 4.52; 95% CI 1.54–15.9]. Among non-marital relationships, external partners of men were mostly out-migrants

Table 1. Characteristics of external relationships by partner type and location when sexual.

Bridge relationship took place	Outside of Likoma				Within Likoma	
Partner type	Out-migrants		Outside partners		In-migrants (visitors)	
Marital relationships						
All ($N = 27$)	15	56% (35.3–75.4)	12	44% (25.6–64.7)	–	–
Men ($N = 5$)	3	60% (14.6–94.7)	2	40% (5.3–85.3)	–	–
Women ($N = 22$)	12	55% (32.2–75.0)	10	45% (25.0–67.8)	–	–
Non-marital relationships						
All ($N = 148$)	47	32% (24.3–39.9)	69	47% (38.4–55.0)	32	22% (15.3–29.1)
Consistent condom use[a]	9	19% (9.1–33.1)	31	45% (32.9–57.4)	7	22% (9.3–40.0)[b]
Men ($N = 75$)	28	37% (26.4–49.3)	40	53% (41.4–65.0)	7	9% (3.8–18.3)
Women ($N = 73$)	19	26% (16.5–37.6)	29	40% (28.4–51.8)	25	34% (23.5–46.3)[c]

Out-migrants: sexual partners who are either temporarily absent from their primary residence on Likoma Island, or who have lived on Likoma Island and permanently migrated within the 5 years before the sexual network survey. Outside partners: sexual partners who have their permanent residence outside Likoma and never lived on the island during the 5 years before the survey; first sexual encounter with the respondent occurred outside the island. Visitors: sexual partners who are not residents of Likoma, but temporarily visited the island and the first sexual encounter with the respondent occurred in Likoma. Notes: Exact 95% confidence intervals are in parentheses.
[a]Among all extramarital relationships.
[b]The difference between types of partners was significant at the 0.05 level, based on Fisher's exact test.
[c]The difference between women and men was significant at the 0.05 level, based on Fisher's exact test.

(37%) or outside partners (53%), whereas external partners of women were frequently visitors (34%). Of the 148 non-marital bridge relationships, more than one fifth took place on the island. In addition, among respondents who were tested for HIV during the Likoma Network Study and had ever been in a relationship with an external partner ($N = 177$), the relative risk of HIV infection was higher among those who reported having been in a partnership with a visitor (unadjusted OR 2.18; 95% CI 0.67–6.48, $P = 0.1$ using Fisher's test).

There are several reasons why spatial bridging through relationships with in-migrants might contribute significantly to HIV spread in rural networks. First, although virtually absent from marital relationships [5], condom use is also less consistent in bridge relationships taking place locally (Table 1), possibly as a result of the lower accessibility of condoms on Likoma (and other rural areas). Second, women are both more susceptible to HIV infection during a single intercourse [6], and are more likely to engage in relationships with visitors. As a result, such bridge relationships could be more efficient pathways for the introduction of HIV into local networks than relationships with male out-migrants. Third, individuals recently infected by visitors experience the early spike in HIV infectivity [7] 'at home', and may expose their, possibly concurrent [8], rural partners to an amplified risk of HIV infection. In contrast, out-migrants who contract HIV while away are likely to be beyond the period of acute HIV infection upon returning to their home communities, and are thus less infectious [9].

In summary, the mechanisms through which out-migrants put their home communities at a higher risk of HIV infection are now well identified [1,9–12], the epidemiological consequences of short-term movement into rural areas are not as well understood. Sexual relationships with in-migrants are common on Likoma Island and possibly in other rural areas of sub-Saharan Africa. Several mechanisms favor the diffusion of HIV after such relationships, but the relative risks associated with these mechanisms need to be assessed in larger longitudinal studies of migration and sexual networks. Models of the impact of migration on HIV epidemics should be broadened to include contexts in which migration flows between rural and urban areas are not only circular, but also include in-migration.

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References

1. Coffee M, Lurie MN, Garnett GP. **Modelling the impact of migration on the HIV epidemic in South Africa.** *AIDS* 2007; **21**:343–350.
2. Tabutin D, Schoumaker B. **The demography of sub-Saharan Africa from the 1950s to the 2000s. A survey of changes and a statistical assessment.** *Population* 2004; **59**:457–555.
3. Helleringer S, Kohler H-P, Chimbiri A, Chatonda P, Mkandawire J. The Likoma Network Study: context, data collection and initial results. University of Pennsylvania, Population Studies Center, PSC Working Paper Series PSC 07-05. Available online at: http://repository.upenn.edu/psc_working_papers/9/ [Accessed: August 2007].
4. Helleringer S, Kohler HP. **Sexual network structure and the spread of HIV in Africa: evidence from Likoma Island, Malawi, 2007**. *AIDS* 2007; 21:In press.
5. Chimbiri A. **The condom is an 'intruder' in marriage: evidence from rural Malawi.** *Soc Sci Med* 2007; **64**:1102–1115.
6. Gray RH, Wawer MJ, Brookmeyer R, Sewankambo NK, Serwadda D, Wabwire-Mangen F, *et al*. **Probability of HIV-1 transmission per coital act in monogamous, heterosexual, HIV-1-discordant couples in Rakai, Uganda.** *Lancet* 2001; **357**: 1149–1153.
7. Wawer M, Gray R, Sewankambo N, Serwadda D, Li X, Laeyendecker O, *et al*. **Rates of HIV-1 transmission per coital act, by stage of HIV-1 infection, in Rakai, Uganda.** *J Infect Dis* 2005; **191**:1403–1409.
8. Morris M, Kretzschmar M. **Concurrent partnerships and the spread of HIV.** *AIDS* 1997; **11**:641–648.
9. Coffee M, Garnett G, Mlilo M, Voeten H, Chandiwana S, Gregson S. **Patterns of movement and risk of HIV infection in rural Zimbabwe.** *J Infect Dis* 2005; **191 (Suppl 1)**:S159–S167.
10. Lurie M, Williams B, Zuma K, Mkaya-Mwamburi D, Garnett G, Sweat J, Gittelsohn MD, *et al*. **Who infects whom? HIV-1 concordance and discordance among migrant and nonmigrant couples in South Africa.** *AIDS* 2003; **17**:2245–2252.
11. Lurie M, Williams B, Zuma K, Mkaya-Mwamburi D, Garnett G, Sturm A, *et al*. **The impact of migration on HIV-1 transmission in South Africa: a study of migrant and nonmigrant men and their partners.** *Sex Transm Dis* 2003; **30**:49–56.
12. Lagarde E, Schim van der Loeff M, Enel C, Holmgren B, Dray-Spira R, Pison G, *et al*. **Mobility and the spread of human immunodeficiency virus into rural areas of West Africa.** *Int J Epidemiol* 2003; **32**:744–752.

Tubercular tracheoesophageal fistulas in AIDS patients: primary repair and no surgery required?

In times of the increasing convergence of HIV and tuberculosis in some areas [1], there is little debate remaining on the best treatment choice for patients presenting with AIDS and tuberculosis [2]. A residual area of uncertainty is represented by the management of tuberculosis-associated tracheo-esophageal, bronco-esophageal or esophagomediastinal fistulas. These conditions represent rare clinical events, fraught with little agreement on clinical management, no controlled studies, several possible complications associated with treatment, possible HIV–tuberculosis medication interactions and procedure-associated morbidity.

There are only 16 reports on AIDS patients with tuberculosis-associated esophageal fistulas (10 broncho-esophageal, 13 esophagomediastinal, five tracheo-esophageal). Whereas broncho-esophageal and esophagomediastinal fistulas have also been treated by conservative