#1034 Population mobility, sexual behavior and risk of HIV infection in Sub-Saharan Africa

Laurence Palk* and Sally Blower *lpalk@mednet.ucla.edu

Center for Biomedical Modeling, Semel Institute for Neuroscience and Human Behavior, David Geffen School of Medicine, UCLA

Objectives

- Quantitatively assess the mobility of the population of Lesotho.
- Identify behavioral and demographic characteristics of travellers.
- Map geographic patterns in mobility.
- Determine if there is an association between mobility and sexual behavior and/or risk of HIV infection.

Data

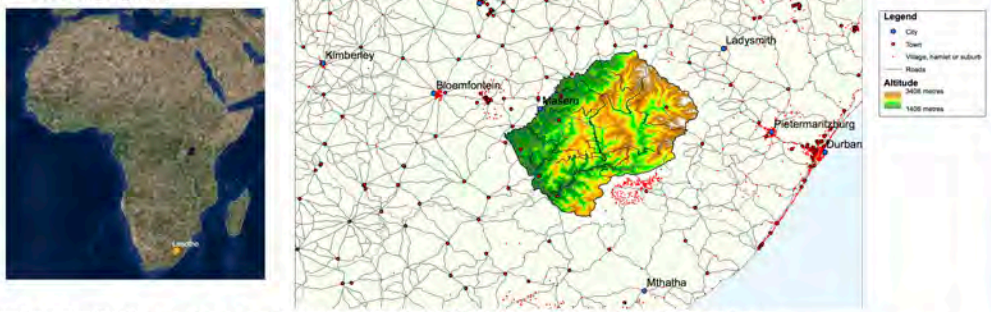
- Data are from the 2009/10 Demographic and Health Survey of Lesotho.
- The response rate was 98% for women, 95% for men.
- >10,000 adult men and women were interviewed.
- 94% of eligible women and 88% of eligible men were tested for HIV.

Methods

- The population was stratified into three travel categories according to the number of overnight trips taken in the last year.
- We compared demographic and behavioral characteristics of individuals in these three travel categories.
- We constructed mobility maps using kriging.
- We used a multivariate analysis to determine if there is an association between mobility and sexual behavior and/or risk of HIV infection.
- The measures of risk behavior and HIV infection were used as response variables; mobility was assessed as an explanatory variable.
- Odds ratios were calculated adjusting for age, employment status, marital status and education.

Background

Figure 1: Lesotho geography



- Lesotho is a landlocked, mountainous country, surrounded by South Africa. The capital city is Maseru in the northwest.
- Lesotho's population is 2 million. The lowlands in the northwest are the most populous. The centre and northeast is mountainous, rural, with low population density. In the southwest is the Senqu river valley with low/medium population density.
- Travel for employment is common; within the country for work in the agriculture and textile industry; and to South Africa for domestic and mine work.
- **HIV prevalence: 27% in women, 18% in men.**

Results: Demographic and behavioral characteristics of travellers

Table 1

Demographic/behavioral characteristics			Women: Overnight trips in the last year 0	Women: 1 to 4	Women: 5 or more	Men: Overnight trips in the last year 0	Men: 1 to 4	Men: 5 or more
Number and % of adult population	N	(%)	1992(51.8%)	1158(30.1%)	699(18.2%)	1467(47.7%)	971(31.6%)	638(20.7%)
Age	Median	(IQR)	25(19-35)	**28(21-36)*** **	**28(21-36)*** **	26(19-38)	25(19-34)	**29(22-38)** **
Live in urban areas	n/N	(%)	595/1992(29.9%)	336/1158(29.0%)	**297/699(42.5%)*** **	342/1467(23.3%)	243/971(25.0%)	**217/638(34.0%)*** **
Employed	n/N	(%)	626/1992(31.4%)	**495/1158(42.7%)*** **	**350/699(50.1%)*** **	872/1467(59.4%)	602/971(62.0%)	**470/638(73.7%)*** **
Ever married	n/N	(%)	1241/1992(62.3%)	**815/1158(70.4%)*** **	**466/699(66.7%)***	654/1467(44.6%)	436/971(44.9%)	**375/638(58.8%)*** **
Secondary or higher education	n/N	(%)	965/1992(48.4%)	599/1158(51.7%)	**413/699(59.1%)*** **	481/1467(32.8%)	**366/971(37.7%)***	**297/638(46.6%)*** **
Number of sex partners in last year	Mean	(SD)	0.74(0.55)	**0.87(0.54)*** **	**0.91(0.56)*** **	0.93(1.17)	**1.08(0.80)*** **	**1.26(0.93)*** **
Age of sexual debut	Median	(IQR)	17(16-19)	18(16-20)	18(16-20)	17(15-20)	17(15-19)	17(15-20)

IQR: Interquartile range. Significance: *** P <0.001, ** 0.001≤P<0.01, * 0.01≤P<0.05

Summary

- The population is highly mobile: 30% of women and 32% of men made 1-4 trips in the last year, 18% of women and 21% of men made ≥5 trips.
- Many who travelled (37% women, 39% men) were away for greater than a month.
- The mobile population is more likely to be older, married, employed, living in urban areas and have a higher level of education.

Acknowledgements

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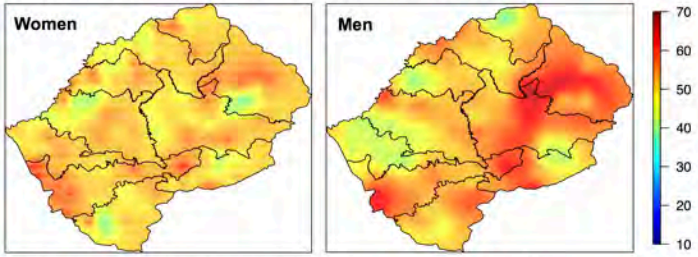
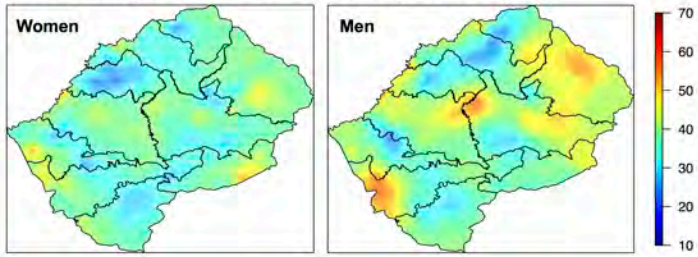
Results: Mobility maps

Figure 2: Percentage of adults who made one or more overnight trips



- High population mobility throughout the country (ranging from ~30-70%) for both men and women.
- Similar levels and geographic patterns of travel for both genders.
- Highest levels of mobility are in the rural, mountainous interior; the semi-rural Senqu river valley in the southwest; and around the capital city Maseru (see Fig. 1).
- Many of the individuals who travel are located near the major border crossings.

Figure 3: Percentage of adult travellers who made five or more overnight trips



- Frequent travellers account for ~10-60% of travellers.
- More men are frequent travelers than women.
- A geographic pattern is seen for frequent travelers who are men, but not for women.
- Men who travel frequently live in the rural, mountainous interior and the semi-rural Senqu river valley.

Results: Associations between mobility and sexual behavior/HIV risk

Table 2

Adjusted odds ratios of HIV infection and sexual risk behavior		Women: Overnight trips in the last year 0	Women: 1 to 4	Women: 5 or more	Men: Overnight trips in the last year 0	Men: 1 to 4	Men: 5 or more
HIV infected	aOR (95% CI)	1 (REF)	0.91 (0.76-1.09)	1.13 (0.92-1.39)	1 (REF)	1.17 (0.93-1.48)	**1.31 (1.01-1.68)***
2 or more sex partners in last year	aOR (95% CI)	1 (REF)	**1.64 (1.22-2.21)****	**1.97 (1.41-2.73)*****	1 (REF)	**1.58 (1.29-1.94)*****	**2.00 (1.60-2.50)*****
Concurrent partnership in last year	aOR (95% CI)	1 (REF)	**1.79 (1.29-2.49)*****	**1.92 (1.33-2.77)*****	1 (REF)	**1.33 (1.05-1.68)***	**1.76 (1.38-2.25)*****

aOR: adjusted odds ratio. CI: Confidence interval. Odds ratios are calculated adjusting for age, employment status, marital status and education. Concurrency: 2 or more partnerships that overlapped in time. Significance: *** P <0.001, ** 0.001≤P<0.01, * 0.01≤P<0.05

Summary

- Men and women who travel are more likely to have multiple partners in the last year; odds increased with the frequency of travel. Those who made ≥5 trips were twice as likely to have had two or more partners than those who did not travel.
- Men and women who travelled were more likely to have concurrent partners than those who did not; odds increased with the frequency of travel.
- Women who traveled (1-4 and ≥5 trips) and men who only traveled infrequently (1-4 trips) did not have an increased risk of HIV infection in comparison with individuals who did not travel.
- Men who travelled frequently (made ≥5 trips) had an increased risk of HIV infection. They were 1.3 times more likely to be infected than men who did not travel.

Conclusions: Implications for treatment and prevention programs

- It is essential to consider travel frequency and patterns when developing HIV prevention and treatment programs.
  - Mobility maps can be used to identify regions with high population mobility, where attaining high levels of drug adherence may be challenging.
  - Treatment programs should collect travel data from patients to help design strategies to enhance adherence.
- Travellers can link localized HIV epidemics, within the country and across international borders.
  - Travel may diffuse the effects of interventions.
  - Specialized interventions are needed for travellers to reduce their sexual risk behavior.
  - It is essential that interventions should target highly mobile men because they may disproportionally contribute to transmission.
  - Mobility maps can be used to identify where there is greatest need for such interventions.
- In Lesotho, and other countries with high levels of mobility (e.g., Zimbabwe, Cameroon and Kenya), it may be more difficult to control HIV epidemics than currently appears.