How Should we Incorporate Geographical Space with Social and Sexual Network Space: HIV as a Case Study

A unifying theme in my research is that sexual networks are highly structured, and the structure and characteristics of sexual networks depends on migration and mobility patterns. Second, sexual networks are the foundation in which most HIV and other sexually transmitted infections occur. Therefore, I am constantly grappling with the best way to characterize and present data on geographical space and movement in space as well as characteristics of sexual networks and how those are associated with geographical space. What are the best ways to link information about geographical space with information about social and sexual networks? How should these two types of “location” information be structured? How should the data be represented? How should geographical information be represented in networks? How should network characteristics and structure be represented in maps of space or mobility flows?

I would be very interested in presenting this topic for discussion in the Spatial Unconference. I propose that some of my work on HIV risk, sexual networks and residential mobility among men who have sex with men (MSM) could be an example with which we could address these challenges of integration.

Significance
The HIV epidemic among men who have sex with men (MSM) continues to expand globally, even though we have many proven ways of treating and preventing HIV. In the U.S., MSM carry a disproportionate disease burden, at nearly 60% of new diagnoses in the United States. Long-standing HIV disparities in the U.S., both by sexual orientation and race, are not fully understood. The root of the disparities is still unknown; but research suggests that standard individual-level sexual risk behavior does not explain HIV disparities among minority MSM. Rather, a
combination of individual, partnership, and structural determinants may be more critical. An understudied area of research is whether immigration and residential mobility are associated with HIV risk at these multiple levels.

Mobility is a part of identity exploration among young adults, the same population that has the highest levels of HIV incidence. About 17% of the American population, but over 30% of young adults aged 20 to 24, move each year. Migration may influence individual risky sexual behavior, partner characteristics, access to and linkage to care, and racial segregation and neighborhood effects. We need to understand when, where, and why MSM migrate, since residential mobility may be a significant factor in social, behavioral, and structural determinants of ongoing HIV transmission among MSM.

Common theory suggests that migrants have higher levels of sexual risk behavior conducive to HIV compared to non-migrants, especially in international settings. However, the association between mobility, race/ethnicity, and risk are complex and nuanced. The relationship depends significantly on the type, distance, destination, duration, social context, and reason to move such as whether the migration was “pushed,” i.e., migration to leave the origin, or “pulled,” i.e., migration for opportunity at the destination. Classical migration theory suggests that individuals choosing to migrate are positively selected on a number of human capital attributes, while individuals less able, motivated, or skilled are less likely to migrate. Contemporary black internal migration has been shown to be driven by the highly educated. However, migrant selection depends on the type of mobility. Positive selectivity is greater among migrants traveling longer than shorter distances. Other research suggests that frequent movers display riskier behavior than non-movers (e.g., higher risk of suicide, drug use, crime, and early sexual debut).

Migration theory is different for men who have sex with men: MSM have different reasons to move (in addition to many typical push/pull reasons), and different experiences in sending and receiving communities depending on socio-political contexts. Gay migrants may be more vulnerable to HIV due to greater sexual opportunities combined with social isolation, poverty, limited knowledge of sexual disease transmission, and anonymity. A lack of social connections to home communities can lead to sexual exploration. However, migration may be an opportunity to “come out” or to explore one’s sexuality. Destination communities may have a positive influence as well: Research has suggested that neighborhood-level gay presence is positively associated with consistent condom use during anal intercourse. Thus the relationship between mobility and HIV risk is most likely non-linear over time; the period immediately after migration to a new city is a time of heightened vulnerability, and risk seems to peak 1–5 years after the move. Of course, HIV-positive men (and diagnosed and un-diagnosed men) may move for very different reasons, such as seeking a less stigmatizing community or better medical care.

**Mobile study**

In September 2015 we will finish primary data collection for the Mobile study, which aims to recruit 400 MSM from the Public Health STD Clinic at Harborview Medical Center in Seattle, Washington. I will use these data to demonstrate the unique challenges and opportunities to integrate geographic information with sexual network characteristics.
measures include age, race, marital status, education, and income. Questions on residential mobility & migration include current place of residence (where individual sleeps most nights), dates (month/year) and locations of origin and destination (zip code (if available), city, and county) for each move since age 15 (in 5-year increments); reason for each move; with whom moved; and with whom lived. We also ascertain country of birth and parent’s birth to identify foreign born and 2nd generation immigrants. Sexual network and risk behavior measures include age, sex, race, and geographic location for the last 5 anal sex partners within last 12 months. Partner-specific questions on dates of first and last sex, whether they expect to have sex again, typical location of sex, frequency of sex acts, types of sex acts, condom use, HIV status and disclosure will also be asked. HIV testing behavior measures are date of last test, date of first positive test (if applicable), and where testing took place. We also obtain HIV status and testing history with chart abstraction.