Relationship Duration and the Hazard of Dissolution

Among adults 15-44 in the National Survey of Family Growth

(preliminary work)

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Motivation

This project is a preliminary dive within a larger research agenda about how network models, more specifically STERGMS (separable temporal exponential random graph models), can represent relationship dynamics in an age-structured population over time. This is particularly important for those models whose outcome of interest is the movement of sexually transmitted diseases through a population, where an individual's chances of acquiring an infection are not only a function of their behavior, but also the behavior of their partners, as well as the broader, often overlapping (concurrent), patterning of relationships across the network.
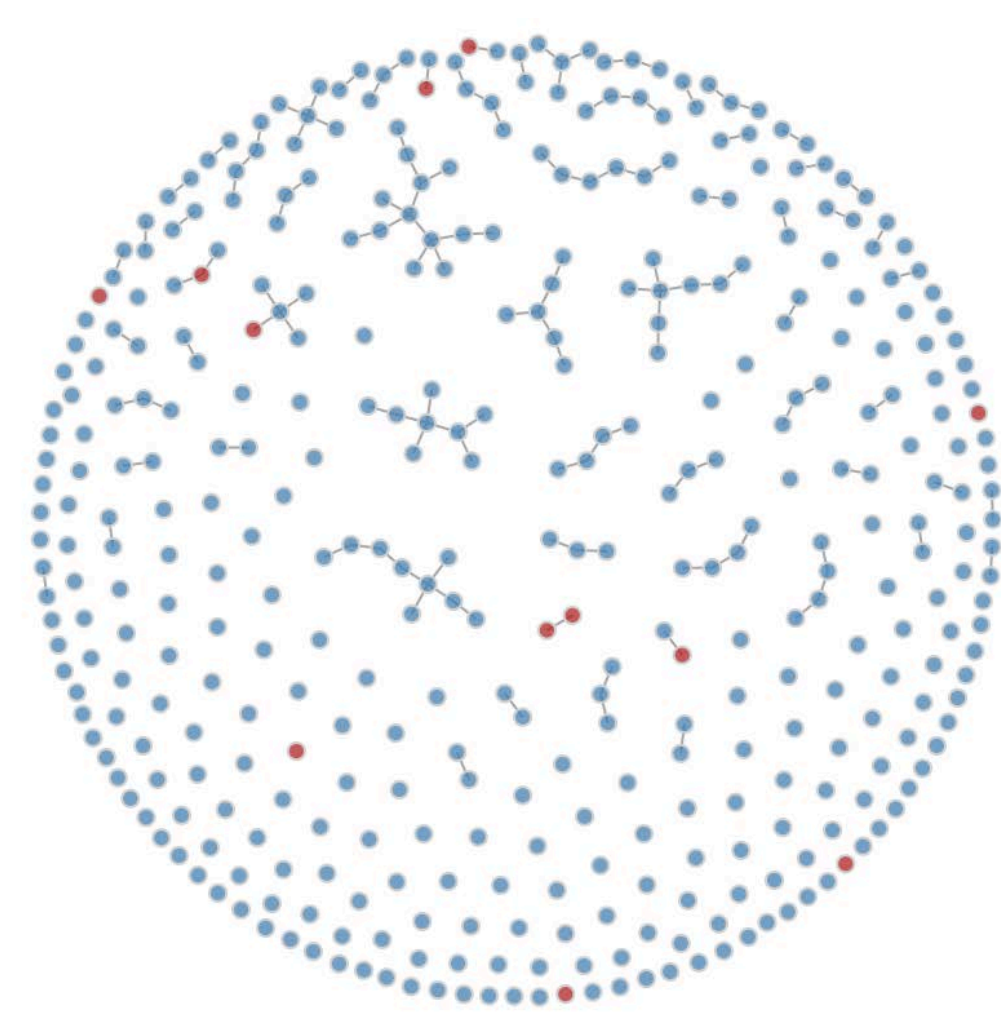

Fig 1. A cross-sectional network example. Blue: uninfected individuals, red: infected individuals.

STERGMs are extremely flexible and capable of maintaining a wide array of cross-sectional network statistics of interest while handling dynamic relationship formation and dissolution over time. For example, a recent model designed to study HIV transmission among opposite-sex partners had a complex component for relationship formation based on the age-and-race-assortative mixing and rates of concurrency found in empirical data. **However, the current standard for the dissolution component assumes that once a relationship begins, its persistence is governed by a constant hazard. While this is a convenient simplifying assumption, it is unclear how well this simplification compares to data.**

Guiding Questions

1. If we assume all partnerships are equal (no age or other covariate effects), is there evidence of a non-constant hazard of dissolution?
2. If so, does this effect disappear if we account for age groups? i.e. is the assumption of an exponential distribution a reasonable simplifying assumption if stratified?
3. Is there a distribution that better captures this process? i.e. a Weibull or a gamma?
4. Which relationships are not well captured by these distributions? The shortest, the longest?
5. What is the mean relationship duration among age categories and are there meaningful differences between groups?

Data

The data come from the 2006-2015 waves of the National Survey of Family Growth. The pooled dataset contains roughly 40,000 respondents aged 15-44. These respondents reported on their marriage and cohabitation history as well as their three most recent sexual partners of the opposite sex in the last 12 months (including demographic characteristics of their partners and the beginning and ending dates of the relationships).

Methodological Issues

Left Truncated Unknown Rels. Observed Rels. Right Censored Rel. Ends
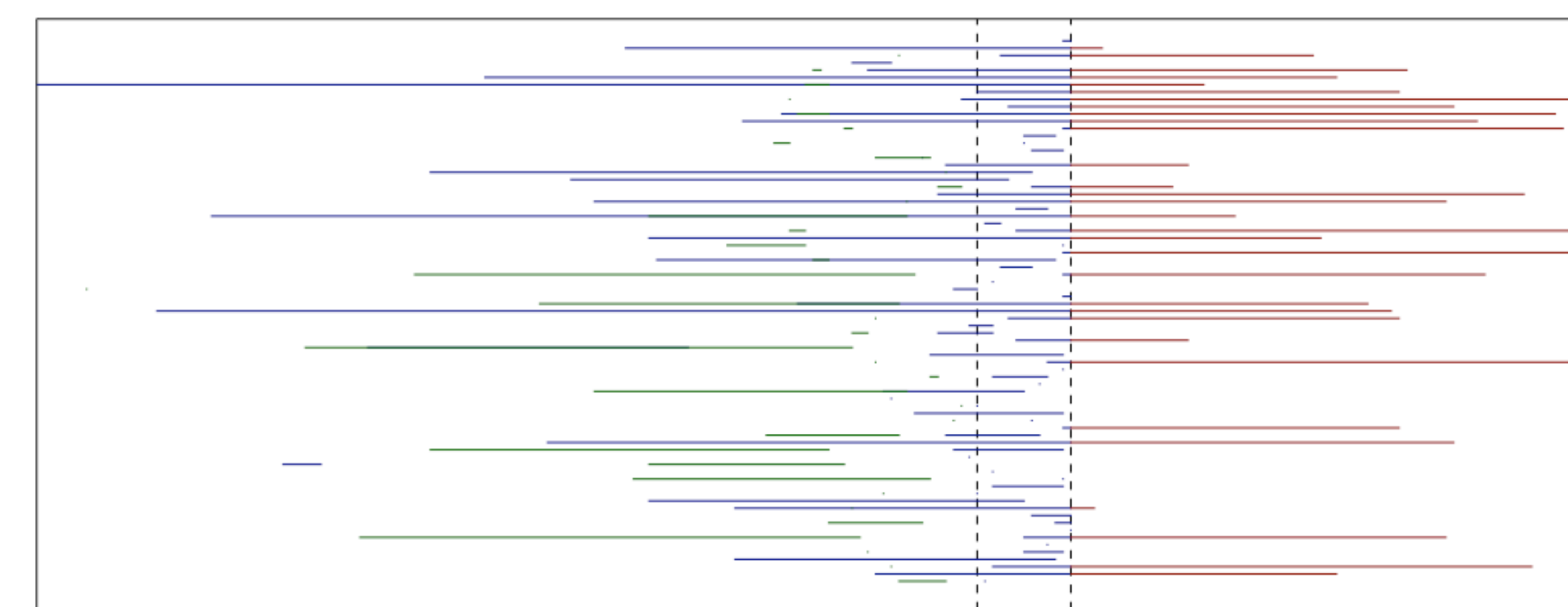
1. Retrospective questions miss relationships that ended prior to the window of interest, and all relationships ongoing at time of interview are right-censored.
2. Some individuals report multiple relationships, need to account for "churn" or serial relationships.

Proposed Solutions:
1. Event history analysis has tools specifically designed for left-truncation and right-censoring of duration data
2. Include random effects for the relationship "churn"?

Conceptual Challenges

Age's effects on relationship duration are complex
1. Relationship age at time of interview usually lower for younger people, but due to a combination of 'churn' and not being alive long enough to have had decades-long relationships.
2. Age *difference* between ego and alter matters, but affect of age difference is likely to vary across the life course.
3. The effect age of age difference on relationship duration may be different depending on if the male or female is the older partner.
4. Which age is most important for relationship persistence? Age at beginning of relationship, or current age?
5. Whose age to model? Ego age? Partner age? Ego age and age difference?

Dyadic Complications
1. Relationship duration is unlikely to be independent of other relationships each partner may be participating in.
2. Is there a way to represent this in a parametric regression model, and if not, what are the consequences of assuming independence between relationships?

Likely others that I haven't listed here!

This project is exploratory and in its infancy so I welcome your
thoughts & suggestions