**Supplementary Methods**

**S.1: Network parameters**

Parameters for the dynamic network were taken from a nationally distributed survey of sexual behaviors among MSM from 2017-2019 (as described in [1]). We recognize that sexual networks among MSM may have been impacted by Covid-19, but extensive egocentric surveys of sexual behavior among MSM taken after Covid-19 restrictions were implemented and relaxed have not been published. Thus, the ARTnet survey represents the most up to date and thorough source of sexual behavior data among MSM. For data on sexual position behavior, ARTnet data was supplemented by prior surveys of sexual behavior among MSM in Atlanta [2] (Table S1).

ARTnet reports the proportion of MSM who have between 0 and 2 ‘Main’ partners and between 0 and 3 ‘Casual’ partners. Individuals with 2 ‘Main’ partners represent a tiny portion of the population (e.g. individuals with 2 ‘Main’ partners and 3 ‘Casual’ partners make up 0.14% of the population). Modeling the behavior of tiny fractions of the population can lead to instability when fitting dynamic network models, so we removed individuals with 2 main partners from the model for this analysis (Table S1).

Table S1: Network parameters.

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| --- | --- |
| **Parameter** | **Value** |
| Proportion individuals with 0 main and 0 casual partners | 0.30 |
| Proportion individuals with 0 main and 1 casual partners | 0.15 |
| Proportion individuals with 0 main and 2 casual partners | 0.132 |
| Proportion individuals with 1 main and 0 casual partners | 0.307 |
| Proportion individuals with 1 main and 1 casual partners | 0.059 |
| Proportion individuals with 1 main and 2 casual partners | 0.055 |
| Mean duration of Main partnerships | 407 days |
| Mean duration of Casual partnerships | 166 days |
| Probability per day of individual in activity group 1 having a one-time sexual contact | 0.000755 |
| Probability per day of individual in activity group 2 having a one-time sexual contact | 0.00832 |
| Probability per day of individual in activity group 3 having a one-time sexual contact | 0.0271 |
| Probability per day of individual in activity group 4 having a one-time sexual contact | 0.0637 |
| Probability per day of individual in activity group 5 having a one-time sexual contact | 0.158 |
| Probability per day of individual in activity group 6 having a one-time sexual contact | 0.371 |
| Proportion of the population in activity group 1 | 0.40 |
| Proportion of the population in activity group 2 | 0.30 |
| Proportion of the population in activity group 3 | 0.15 |
| Proportion of the population in activity group 4 | 0.10 |
| Proportion of the population in activity group 5 | 0.04 |
| Proportion of the population in activity group 6 | 0.01 |
| Mean difference between square roots of ages of Main partners | 0.519 |
| Mean difference between square roots of ages of Casual partners | 0.875 |
| Mean difference between square roots of ages of Instantaneous partners | 0.801 |
| Proportion of population who are exclusively insertive | 0.242 |
| Proportion of population who are exclusively receptive | 0.321 |
| Proportion of population who are versatile | 0.437 |
| Probability of having sexual contact per timestep with Main partner | 0.22 |
| Probability of having sexual contact per timestep with Casual partner | 0.14 |
| Probability of having sexual contact per timestep with one-time partner | 1 |

**Bibliography**

1. Weiss KM, Goodreau SM, Morris M, et al. Egocentric sexual networks of men who have sex with men in the United States: Results from the ARTnet study. *Epidemics*. 2020; 30:100386.

2. Jenness SM, Weiss KM, Goodreau SM, et al. Incidence of Gonorrhea and Chlamydia Following Human Immunodeficiency Virus Preexposure Prophylaxis Among Men Who Have Sex With Men: A Modeling Study. *Clin Infect Dis*. 2017; 65(5):712–718.

3. Saldarriaga, et al.