SUPPLEMENTARY BOX 1. Simulation Design and sexual behavior data

Contact network data source

- A dynamic network model was used to simulate transmission of monkeypox in a closed population of gay, bisexual, and other men who have sex with men (MSM). The sexual behavior of MSM in the model is based on surveys of MSM, where men were asked about the number of "main" partnerships (partnerships were "defined as main if the respondent indicated that it was someone they 'felt committed to above all others' or that they considered the person their 'primary sex partner'") and "casual" partnerships (ongoing sexual contacts who did not meet the criteria for "Main" partners). Based on these survey results, the percentage of MSM in the model to have a given number of main and casual sexual partners were estimated for the model. Each relationship type has a survey-derived expected duration, and new partnerships form in the model to keep the percentages of main and casual partners constant over time.

- Surveyed MSM were further asked about the number of "one-time" sexual partnerships (sexual partnerships with a single contact event) that they had had recently. Based on survey responses, MSM in the model have a probability of having one-time sexual encounters each day that is determined by their relationship status and an assigned sexual activity level.

Age-mixing and sexual positioning

- Persons are more likely to have sexual contact with other persons close to their own age, an effect that is strongest in young persons.

- Further, persons are assigned a sexual role (exclusively insertive, exclusively receptive, or versatile). Persons with an exclusive role do not have sexual contact with others of the same role. This feature adds realism to the network structure. However, the model assumes symmetric risk per contact, which is not the case when sexual role is considered for other sexually transmitted infections like HIV or gonorrhea.

Seeding and natural history of infection

- A population of 10,000 MSM was seeded with 10 infectious persons in activity groups 5 and 6. At each timestep, infectious persons have a probability of transmitting monkeypox to sexual contacts who have not yet been infected. These newly infected persons move into an incubating class, where they have a per day probability of becoming infectious. Infectious persons have a per day probability of naturally recovering and becoming permanently resistant to further monkeypox infection. Finally, persons are divided into two groups: those who might seek treatment, and those who will not (representing persons with no access to care or who have very minor symptoms). Those persons who will eventually seek care have a per day probability of seeking treatment, at which point they will recover and become resistant.

Model calibration

- The model was parametrized by adjusting the per act transmission probability so that approximately 15% and 25% of men would become infected over the course of the outbreak.

Simulation design

- For each parameterization, 100 stochastic trials were run; trials where stochastic extinction occurred were excluded.

Technical limitations

- Modeled sexual contact is based on surveys of anal intercourse behavior. Since monkeypox can spread through skin-to-skin contact, contact might be underestimated. Similarly, the model

does not consider potential fomite transmission, transmission through oral sex, or transmission through other nonsexual behaviors.

- No seasonality in sexual behaviors is assumed.

- Potential partner preferences by race, ethnicity, and HIV serostatus are ignored.

- The results presented here are based on a modelled population of 10,000 sexually connected MSM. This population size might be reflective of some areas (e.g., Washington D.C.) but is a smaller population than exists in other major metropolitan areas (e.g., Chicago, Los Angeles).