Effects of variation on peak epidemic size. Bolded p-values indicate significant differences in peak epidemic size on the log-scale, italicized p-values indicate that the residuals of the model were not normally distributed.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | c-shed | | Alpha-gamma | | c-alpha | | c-gamma | | Shed-alpha | | Shed-gamma | |
|  |  | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value |
| (0) Cov | H-L | 0.01 | 0.92 | 0.23 | **0.00** | 0.02 | 0.28 | 0.17 | **0.00** | -0.07 | **0.00** | 0.09 | **0.00** |
| H-M | 0.03 | 0.55 | 0.18 | **0.00** | 0.01 | 0.79 | 0.16 | **0.00** | -0.08 | **0.00** | 0.05 | **0.00** |
| L-M | 0.02 | 0.60 | -0.05 | **0.00** | -0.01 | 0.65 | -0.01 | 0.54 | -0.01 | 0.81 | -0.03 | **0.05** |
| (-) Cov | H-L |  |  | 0.22 | **0.00** | 0.21 | **0.00** | 0.29 | **0.00** | 0.07 | **0.00** | 0.20 | **0.00** |
| H-M |  |  | 0.20 | **0.00** | 0.13 | **0.00** | 0.18 | **0.00** | 0.03 | 0.19 | 0.10 | **0.00** |
| L-M | 0.20 | *0.00* | -0.03 | **0.02** | -0.07 | **0.00** | -0.11 | **0.00** | -0.04 | **0.02** | -0.10 | **0.00** |
| (+) Cov | H-L | 0.21 | **0.00** | 0.27 | **0.00** | 0.17 | **0.00** | 0.27 | **0.00** | -0.02 | 0.35 | 0.11 | **0.00** |
| H-M | 0.13 | **0.00** | 0.20 | **0.00** | 0.10 | **0.00** | 0.23 | **0.00** | -0.05 | **0.01** | 0.09 | **0.00** |
| L-M | -0.09 | **0.00** | -0.07 | **0.00** | -0.07 | **0.00** | -0.04 | **0.01** | -0.03 | 0.21 | -0.02 | 0.16 |

Effects on equilibrium epidemic size.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | c-shed | | Alpha-gamma | | c-alpha | | c-gamma | | Shed-alpha | | Shed-gamma | |
|  |  | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value |
| (0) Cov | H-L | -25.2 | ***0*** | 55.9 | ***0.00*** | 2.35 | *0.48* | 35.9 | **0.00** | -7.71 | ***0.00*** | 25.7 | ***0.00*** |
| H-M | -26.5 | ***0*** | 42.9 | ***0.00*** | 0.38 | *0.98* | 25.1 | **0.00** | -7.70 | ***0.00*** | 16.2 | ***0.00*** |
| L-M | -1.3 | *0.86* | -13.1 | ***0.00*** | -1.97 | *0.57* | -10.7 | **0.00** | 0.01 | *1.00* | -9.52 | ***0.00*** |
| (-) Cov | H-L |  |  | 59.3 | ***0.00*** | 12.6 | ***0.00*** | 55.7 | **0.00** | 3.16 | 0.21 | 46.9 | ***0.00*** |
| H-M |  |  | 46.8 | ***0.00*** | 8.95 | ***0.00*** | 37.4 | **0.00** | 1.21 | 0.79 | 33.0 | ***0.00*** |
| L-M | 11.7 | **0.00** | -12.5 | ***0.00*** | -3.62 | *0.16* | -18.3 | **0.00** | -1.94 | 0.53 | -14.0 | ***0.00*** |
| (+) Cov | H-L | 1.76 | *0.59* | 69.9 | **0.00** | 1.61 | *0.78* | 46.5 | **0.00** | -2.05 | *0.55* | 35.2 | **0.00** |
| H-M | -3.90 | *0.14* | 48.1 | **0.00** | -2.20 | *0.63* | 35.6 | **0.00** | -0.64 | *0.94* | 24.7 | **0.00** |
| L-M | -5.66 | *0.48* | -21.8 | **0.00** | -3.82 | *0.24* | -9.98 | **0.00** | 1.41 | *0.73* | -10.5 | **0.00** |

Effects of covariation on peak epidemic size

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | c-shed | | Alpha-gamma | | c-alpha | | c-gamma | | Shed-alpha | | Shed-gamma | |
|  |  | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value |
| High | (+)-(0) | 0.23 | **0.00** | 0.05 | **0.00** | 0.12 | **0.00** | 0.10 | *0.00* | 0.06 | **0.01** | 0.05 | **0.00** |
| (+)-(-) |  |  | 0.05 | **0.00** | -0.05 | **0.01** | 0.00 | *1.00* | -0.10 | **0.00** | -0.05 | **0.00** |
| (0)-(-) |  |  | 0.00 | 0.95 | -0.18 | **0.00** | -0.10 | *0.00* | -0.15 | **0.00** | -0.11 | **0.00** |
| Med | (+)-(0) | 0.13 | **0.00** | 0.02 | 0.06 | 0.04 | **0.05** | 0.03 | 0.15 | 0.03 | 0.15 | 0.01 | 0.53 |
| (+)-(-) | 0.31 | **0.00** | 0.04 | **0.00** | -0.02 | 0.55 | -0.06 | **0.00** | -0.02 | 0.34 | -0.05 | **0.00** |
| (0)-(-) | 0.18 | **0.00** | 0.02 | 0.22 | -0.05 | **0.00** | -0.08 | **0.00** | -0.05 | **0.00** | -0.06 | **0.00** |
| Low | (+)-(0) | 0.02 | *0.25* | 0.01 | 0.86 | -0.02 | 0.20 | 0.00 | *0.95* | 0.01 | 0.80 | 0.03 | 0.16 |
| (+)-(-) | 0.03 | *0.16* | 0.00 | 1.00 | -0.01 | 0.48 | 0.01 | *0.57* | -0.01 | 0.89 | 0.03 | **0.05** |
| (0)-(-) | 0.00 | *0.96* | -0.01 | 0.89 | 0.01 | 0.84 | 0.01 | *0.75* | -0.02 | 0.52 | 0.01 | 0.86 |

Effects of variation on superspreading (the fraction of total infections caused by the top 20% of spreaders)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | c-shed | | Alpha-gamma | | c-alpha | | c-gamma | | Shed-alpha | | Shed-gamma | |
|  |  | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value |
| (0) Cov | H-L | 0.32 | **0.00** | 0.04 | **0.00** | 0.26 | **0.00** | 0.25 | **0.00** | 0.24 | **0.00** | 0.23 | **0.00** |
| H-M | 0.16 | **0.00** | 0.02 | **0.00** | 0.15 | **0.00** | 0.14 | **0.00** | 0.15 | **0.00** | 0.14 | **0.00** |
| M-L | 0.15 | **0.00** | 0.02 | **0.01** | 0.10 | **0.00** | 0.11 | **0.00** | 0.09 | **0.00** | 0.10 | **0.00** |
| (-) Cov | H-L | 0.27 | **0.00** | 0.03 | **0.00** | 0.31 | **0.00** | 0.30 | **0.00** | 0.26 | **0.00** | 0.26 | **0.00** |
| H-M | 0.15 | **0.00** | 0.01 | **0.00** | 0.17 | **0.00** | 0.16 | **0.00** | 0.14 | **0.00** | 0.14 | **0.00** |
| M-L | 0.12 | **0.00** | 0.01 | **0.00** | 0.13 | **0.00** | 0.14 | **0.00** | 0.12 | **0.00** | 0.13 | **0.00** |
| (+) Cov | H-L | 0.32 | **0.00** | 0.03 | **0.00** | 0.29 | **0.00** | 0.29 | **0.00** | 0.24 | **0.00** | 0.24 | **0.00** |
| H-M | 0.12 | **0.00** | 0.01 | **0.00** | 0.18 | **0.00** | 0.18 | **0.00** | 0.15 | **0.00** | 0.14 | **0.00** |
| M-L | 0.20 | **0.00** | 0.02 | **0.00** | 0.11 | **0.00** | 0.11 | **0.00** | 0.09 | **0.00** | 0.10 | **0.00** |

Effects of covariation on superspreading (the fraction of total infections caused by the top 20% of spreaders)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | c-shed | | Alpha-gamma | | c-alpha | | c-gamma | | Shed-alpha | | Shed-gamma | |
|  |  | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value | Contrast | p-value |
| Low | (+)-(0) | 0.003 | 0.310 | -0.002 | 0.641 | 0.000 | 0.977 | -0.002 | 0.621 | 0.000 | 0.996 | 0.001 | 0.928 |
| (+)-(-) | 0.011 | **0.000** | -0.001 | 0.952 | -0.006 | **0.008** | -0.005 | **0.031** | -0.002 | 0.510 | -0.004 | 0.096 |
| (0)-(-) | 0.009 | **0.000** | 0.001 | 0.818 | -0.005 | **0.015** | -0.003 | 0.239 | -0.002 | 0.457 | -0.004 | **0.040** |
| Med | (+)-(0) | 0.049 | **0.000** | 0.005 | **0.018** | 0.005 | 0.294 | -0.003 | 0.812 | -0.001 | 0.969 | 0.001 | 0.977 |
| (+)-(-) | 0.093 | **0.000** | 0.008 | **0.000** | -0.028 | **0.000** | -0.036 | **0.000** | -0.027 | **0.000** | -0.031 | **0.000** |
| (0)-(-) | 0.044 | **0.000** | 0.003 | 0.303 | -0.033 | **0.000** | -0.033 | **0.000** | -0.027 | **0.000** | -0.032 | **0.000** |
| High | (+)-(0) | 0.004 | 0.969 | -0.007 | 0.422 | 0.033 | **0.003** | 0.039 | 0.008 | -0.001 | 0.990 | 0.011 | 0.600 |
| (+)-(-) | 0.063 | **0.007** | 0.006 | 0.560 | -0.023 | **0.048** | -0.022 | 0.181 | -0.025 | **0.026** | -0.024 | 0.100 |
| (0)-(-) | 0.058 | **0.014** | 0.012 | 0.061 | -0.057 | **0.000** | -0.062 | **0.000** | -0.024 | **0.037** | -0.035 | **0.009** |