**Appendices**







Appendix Figure 1. Simulation outcomes for (A) people flow, (B) people dining out, and (C) eWOM mass compared to real metrics

Appendix Table 1. Parametrisation of quantitative model

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Meaning | Initial value | Equations | Comments |
| Disease Spreading Part |
| Susceptible | Susceptible (not immunised) people | 1.40 x 10 7 | -Infection | Whole Tokyo metropolitan population |
| Infected | People newly infected on a given day | 149 | infection-apparent Infection-inapparent infection | Initial value: calculated from actual confirmed positives after incubation period, apparent ratio, and testing policy |
| Apparent | People who newly appeared to be symptomatic | 60 | apparent Infection-not tested-virus testing symptomatic | Initial value: calculated from actual confirmed positives and testing policy |
| Inapparent | People inapparently infected and acting as virus carriers | 664 | inapparent infection-inapparent recovery | Initial value: calculated from actual confirmed positives, apparent ratio, and testing policy |
| Confirmed positives | People tested and confirmed as positive | 5 | virus testing symptomatic-hospitalisation | Initial value: actual confirmed positives |
| Not tested positives | People who are symptomatic and treated at home but not virus tested | 50 | not tested-not tested recovery | Initial value: calculated from actual confirmed positives and testing policy |
| Susceptible ratio | Effect of probability for a carrier to meet susceptible people | - | Susceptible/1.40 x 10 7 | - |
| Reproduction rate | Standard reproduction rate (2.9　/ occasion) calibrated to a unit time (day) | 0.207 | - | 2.9: median of reported R0 [33] |
| Temperature effect | Transmission affected by wet balb temperature [15] | 1.0 | 15 May 2020: 1.215 Jun 2020: 1.615 Jul 2020: 1.115 Sep 2020: 1.6 | Monthly average temperature was used |
| Apparent ratio |  | 0.375 | - | [34] |
| Incubation time |  | 5 | - | [34] |
| Apparent infection |  |  | Infected\*apparent ratio/incubation time | - |
| Inapparent infection |  |  | Infected\*(1-apparent ratio)/incubation time | - |
| Inapparent virus clearance period |  | 8 | - | Tentative turnover 14 days minus infection day and incubation period |
| Testing policy | Initially, testing frequency was limited | 0.5 | Raised to 1.0 after 10 May 2020 | Half of the fevers are early onset [35] |
| People Flow and Behavior Part |
| Baseline People Flow | Baseline in representative crowded place | 250000 | - | 250,000 per representative traffic node |
| Daily Maximum People Flow | Maximum people flow in crowded places represented by station | 0 | Baseline People Flow\*(1-0.2 x school closure commuting effect-0.1 x stay-at-home request -0.1 x short-term epidemic consciousness - 0.4 x new normal lifestyle effect | - |
| Behaviour guidance | Exclusive guidance from Government | 0 | 15 Apr 2020: 1 | Recognition at this time point was suggested by LINE survey [23] |
| Distancing and protective behaviour facto | Reduced risk by individual protective behaviour (wearing masks, distancing) | 0.5 | - | [11] |
| Protective behaviour under epidemic condition | Probability for each person to act ideal protective behaviour | 0.6 | - | Estimated from the finding that about 60% of survey respondents thought more stringent measures were necessary in June 2020 [28] |
| Protective behaviour under normal condition | Probability for each person to act according to ideal protective behaviours | 0.3 | - | Half probability of epidemic condition |
| Restaurant Industry Part |
| Customer Staying home |  | 1.07x 10 7 | dining out to home-dining out | Initial value: population of Tokyo consisting of individuals 15 to 74 years of age |
| Customer Dining Out |  | 0 | dining out-dining out to home |  |
| Dining Out | Movement to dining out | 0 | baseline dining out x(1-0.2 x school-closure psychological effect-0.1 x stay-at-home request -0.1 x mid-term epidemic consciousness -0.1 x focused intervention effect -0.3 x long-term epidemic consciousness |  |
| eWOM Mass | Relative daily eWOM mass  | 0 | (1-0.2 x school-closure psychological effect -0.2 x long-term epidemic consciousness - 0.1 x stay-at-home request -0.1 x focused intervention effect - 0.1 x mid-term epidemic consciousness) |  |

Appendix Table 2. Parametrisation in each scenario

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Realistic | Second Emergency | Pre-Emptive Shorter Emergency | Exhaustive Emergency |
| Short-term epidemic consciousness | Initial: 027 Mar 2020: 130 May 2020: 005 Jul 2020: 115 Sep 2020: 0 | Initial: 027 Mar 2020: 130 May 2020: 005 Jul 2020: 101 Sep 2020: 0 | Initial: 027 Mar 2020: 130 May 2020: 028 Jun 2020: 128 Jul 2020: 0 | Initial: 027 Mar 2020: 130 May 2020: 003 Jul 2020: 101 Sep 2020: 0 |
| Mid-term epidemic consciousness | Initial: 027 Mar 2020: 130 May 2020: 0 | Initial: 027 Mar 2020: 130 May 2020: 0 | Initial: 027 Mar 2020: 130 May 2020: 0 | Initial: 027 Mar 2020: 130 May 2020: 0 |
| Long-term epidemic consciousness | Initial: 027 Mar 2020: 1 | Initial: 027 Mar 2020: 1 | Initial: 027 Mar 2020: 1 | Initial: 027 Mar 2020: 1 |
| School closure, psychological effect | Initial: 126 May 2020: 0 | Initial: 126 May 2020: 0 | Initial: 126 May 2020: 0 | Initial: 126 May 2020: 0 |
| Stay-at-home request | Initial: 008 Apr 2020: 126 May 2020: 0 | Initial: 008 Apr 2020: 126 May 2020:019 Jul 2020: 101 Sep 2020 :0 | Initial: 008 Apr 2020: 126 May 2020: 028 Jun 2020: 128 Jul 2020: 0 | Initial: 029 Mar 2020: 130 May 2020: 003 Jun 2020: 101 Sep 2020: 0 |