

**Table S2:** Model fit parameters for the top-50 MPZs.

| Rank | MPZ1  | $N_{total}^2$     | $t_0^3$ (weeks)   | $t^4$ (weeks)     | $\Delta t^5$ (weeks)    | Baseline <sup>6</sup>   | $p_C^7$                 | $R_0^{18}$           | $R_0^{19}$               | $ATC_C^{10}$   |
|------|-------|-------------------|-------------------|-------------------|-------------------------|-------------------------|-------------------------|----------------------|--------------------------|----------------|
| 1    | 23708 | 15842             | 23.7 [22.9, 24.4] | 6.55 [5.34, 7.8]  | 6.26 [5.25, 7.52]       | 2.15 [1.76, 2.61]       | 0.121 [0.105, 0.139]    | 1.4 [1.35, 1.48]     | 1.12 [1.08, 1.17]        | 330 [326, 338] |
| 2    | 80913 | 24116             | 14.7 [12.5, 16.3] | 13.5 [12, 15.4]   | 1.92 [1.08, 12.2]       | 2.98 [2.58, 3.42]       | 0.0588 [0.0413, 0.0673] | 1.18 [1.15, 1.21]    | 1.47 [1.36, 1.72]        | 379 [375, 387] |
| 3    | 78236 | 24823             | 1.18 [1.02, 1.71] | 23.3 [22.3, 23.9] | 1.87 [1.05, 3.03]       | 1.43 [1.06, 1.86]       | 0.117 [0.104, 0.129]    | 1.07 [1.07, 1.08]    | 1.37 [1.26, 1.68]        | 393 [388, 400] |
| 4    | 92134 | 14775             | 1.1 [1.01, 1.48]  | 25.5 [24.7, 25.9] | 22.2 [13.5, 37.6]       | 1.88 [1.46, 2.36]       | 0.0598 [0.0518, 0.0687] | 1.13 [1.12, 1.14]    | 1.53 [1.46, 1.61]        | 392 [388, 400] |
| 5    | 23665 | 11554             | 23 [22.3, 23.7]   | 11.5 [10.5, 12.7] | 18.2 [8.35, 37.1]       | 1.96 [1.64, 2.34]       | 0.0574 [0.0504, 0.0655] | 1.4 [1.35, 1.45]     | 2.07 [1.86, 2.32]        | 312 [308, 319] |
| 6    | 92055 | 26561             | 2.26 [1.4, 4.44]  | 13.2 [12.1, 13.8] | 1.25 [1.02, 1.74]       | 1.13 [0.748, 1.62]      | 0.0806 [0.0691, 0.09]   | 1.14 [1.13, 1.15]    | 0.0209 [0.00159, 0.0862] | 404 [399, 411] |
| 7    | 99506 | 9781              | 11.9 [6.77, 13.7] | 9.19 [2.54, 31.1] | 1.5 [1.03, 12.2]        | 0.888 [0.567, 1.26]     | 0.244 [0.17, 0.55]      | 1.09 [0.988, 1.14]   | 1.48 [1.01, 1.82]        | 286 [280, 298] |
| 8    | 29207 | 24012             | 1.36 [1.14, 5.72] | 9.27 [4.26, 9.93] | 3.1 [2.32, 4.37]        | 0.956 [0.605, 1.5]      | 0.887 [0.412, 0.992]    | 0.959 [0.951, 0.97]  | 1.5 [1.34, 1.54]         | 405 [399, 430] |
| 9    | 78234 | 15355             | 8.88 [8.63, 9.09] | 4.48 [4.05, 4.95] | 9.01 [8.28, 9.71]       | 1.29 [1.01, 1.61]       | 0.0518 [0.0468, 0.0574] | 1.5 [1.49, 1.52]     | 1.12 [1.11, 1.13]        | 360 [357, 368] |
| 10   | 32542 | 10337             | 14.1 [13, 15.6]   | 12.3 [10.5, 13.9] | 2.64 [1.16, 8.98]       | 0.827 [0.455, 1.19]     | 0.149 [0.122, 0.2]      | 1.18 [1.15, 1.21]    | 0.981 [0.726, 1.06]      | 272 [267, 280] |
| 11   | 42223 | 15019             | 13.3 [1.18, 20.3] | 11.1 [1.85, 21.7] | 4.21 [1.18, 10.7]       | 0.43 [0.0805, 0.776]    | 0.15 [0.094, 0.391]     | 1.05 [0.973, 1.13]   | 1.31 [1.17, 1.86]        | 227 [222, 235] |
| 12   | 23511 | 7254              | 23.2 [22.6, 23.8] | 17.7 [15.6, 20.4] | 6.85 [3.88, 9.94]       | 0.398 [0.244, 0.6]      | 0.0963 [0.0851, 0.108]  | 1.33 [1.3, 1.37]     | 2.16 [1.91, 2.61]        | 236 [232, 244] |
| 13   | 76544 | 32831             | 1.93 [1.07, 5.28] | 23.6 [19.2, 29.7] | 1.49 [1.03, 20.2]       | 0.816 [0.191, 1.18]     | 0.0457 [0.0379, 0.161]  | 1.09 [1.08, 1.11]    | 1.34 [0.961, 1.51]       | 285 [280, 294] |
| 14   | 79920 | 20999             | 15.9 [15.3, 16.8] | 5.25 [4.12, 5.94] | 2.9 [1.49, 5.71]        | 1.82 [1.51, 2.17]       | 0.0228 [0.0189, 0.0263] | 1.41 [1.37, 1.51]    | 0.442 [0.0175, 0.883]    | 298 [294, 306] |
| 15   | 22134 | 11588             | 7.15 [7.06, 7.23] | 1.43 [1.04, 1.93] | 6.04 [5.34, 6.72]       | 1.2 [0.973, 1.46]       | 0.0246 [0.0219, 0.0274] | 2.65 [2.5, 2.78]     | 1.08 [1.04, 1.12]        | 378 [374, 385] |
| 16   | 89191 | 12110             | 22.5 [18, 24.4]   | 9.73 [1.44, 13.3] | 5.63 [1.07, 31.7]       | 0.626 [0.43, 0.85]      | 0.053 [0.0357, 0.135]   | 1.32 [0.951, 1.7]    | 1.31 [0.687, 2.01]       | 213 [206, 224] |
| 17   | 28547 | 10719             | 1.99 [1.07, 4.1]  | 11.4 [7.82, 13.5] | 3.69 [1.1, 10.8]        | 1.23 [0.745, 1.78]      | 0.109 [0.0714, 0.151]   | 1.12 [1.09, 1.17]    | 0.878 [0.164, 1.02]      | 305 [301, 312] |
| 18   | 94535 | 13454             | 2.3 [1.11, 5.75]  | 12.6 [8.61, 15]   | 1.99 [1.06, 8.06]       | 1.7 [1.13, 2.34]        | 0.071 [0.0386, 0.127]   | 1.12 [1.07, 1.19]    | 0.727 [0.129, 1.02]      | 301 [297, 310] |
| 19   | 98431 | 20071             | 5.03 [4.04, 6.02] | 5.26 [3.73, 6.39] | 12 [9.63, 14.9]         | 1.09 [0.788, 1.45]      | 0.022 [0.0166, 0.0276]  | 1.42 [1.33, 1.63]    | 0.945 [0.843, 1.03]      | 279 [274, 292] |
| 20   | 28763 | 4.03 [2.88, 4.62] | 9.82 [5.8, 13.6]  | 16.2 [10.9, 21.1] | 0.0109 [0.00017, 0.518] | 0.869 [0.499, 0.99]     | 0.869 [0.499, 0.99]     | 0.965 [0.954, 0.973] | 1.07 [1.05, 1.11]        | 263 [258, 272] |
| 21   | 32214 | 12910             | 6.49 [1.12, 12.7] | 3.7 [1.12, 34.5]  | 2.33 [1.07, 30.2]       | 0.897 [0.546, 1.27]     | 0.0811 [0.0603, 0.212]  | 1.11 [0.98, 1.13]    | 0.974 [0.198, 1.36]      | 264 [261, 271] |
| 22   | 85309 | 7996              | 25.2 [24.3, 25.7] | 4.41 [3.21, 5.7]  | 5.42 [3.69, 6.91]       | 0.215 [0.0996, 0.402]   | 0.0646 [0.0536, 0.0774] | 1.59 [1.47, 1.76]    | 1.14 [1.04, 1.24]        | 170 [165, 178] |
| 23   | 30905 | 20883             | 1.55 [1.04, 2.85] | 25.5 [1.31, 36.8] | 12.5 [1.16, 33.6]       | 0.273 [0.00212, 0.536]  | 0.0682 [0.0492, 0.554]  | 1.09 [0.939, 1.14]   | 0.974 [0.129, 1.18]      | 240 [235, 249] |
| 24   | 20762 | 14416             | 6.15 [1.4, 16.3]  | 11.7 [4.71, 25.6] | 12.1 [2.86, 17.2]       | 0.315 [0.0017, 0.699]   | 0.413 [0.0791, 0.949]   | 0.935 [0.893, 1.05]  | 1.16 [1.1, 1.32]         | 219 [212, 228] |
| 25   | 22060 | 14138             | 3.14 [1.12, 9.1]  | 25.1 [18.6, 27.8] | 2.37 [1.34, 4.25]       | 0.656 [0.432, 0.948]    | 0.0421 [0.0333, 0.0527] | 1.06 [1.04, 1.08]    | 1.62 [1.41, 1.75]        | 219 [215, 228] |
| 26   | 40121 | 14289             | 14.9 [2.09, 16.3] | 20.4 [1.26, 24.8] | 17.5 [3.39, 34.8]       | 0.673 [0.466, 0.923]    | 0.451 [0.0779, 0.934]   | 1.05 [0.603, 1.1]    | 0.549 [0.0969, 1.11]     | 282 [275, 291] |
| 27   | 39534 | 12782             | 5.12 [1.38, 17.9] | 9.43 [2.99, 17.1] | 16.6 [1.23, 20.6]       | 0.665 [0.257, 1.18]     | 0.571 [0.0347, 0.959]   | 0.942 [0.889, 1.23]  | 1.09 [0.437, 1.12]       | 283 [275, 295] |
| 28   | 23801 | 7683              | 8.33 [2.58, 15.2] | 5.11 [1.56, 14.1] | 2.11 [1.13, 12.6]       | 0.402 [0.238, 0.627]    | 0.0805 [0.0658, 0.108]  | 1.18 [1.07, 1.21]    | 0.546 [0.0804, 1.33]     | 222 [216, 232] |
| 29   | 29905 | 4090              | 9.33 [8.29, 10.6] | 5.7 [4.16, 7.85]  | 7.11 [1.54, 10.1]       | 0.15 [0.0634, 0.294]    | 0.146 [0.115, 0.178]    | 1.25 [1.2, 1.35]     | 0.95 [0.439, 1.03]       | 276 [272, 284] |
| 30   | 23604 | 11994             | 24.3 [23.2, 24.8] | 10.9 [10.1, 12.1] | 15.7 [6.25, 36.3]       | 0.284 [0.168, 0.437]    | 0.021 [0.0177, 0.0257]  | 1.44 [1.36, 1.48]    | 2.43 [1.99, 2.83]        | 201 [198, 209] |
| 31   | 32228 | 6860              | 1.15 [1.01, 1.52] | 1.55 [1.04, 4.02] | 1.56 [1.04, 5.25]       | 0.003 [0.000136, 0.117] | 0.195 [0.163, 0.228]    | 1.08 [1.07, 1.09]    | 0.615 [0.306, 0.963]     | 245 [242, 252] |
| 32   | 20889 | 16676             | 7.27 [2.37, 10.5] | 7.16 [4.36, 25.4] | 7.76 [1.36, 15.2]       | 0.347 [0.162, 0.608]    | 0.0343 [0.0251, 0.044]  | 1.2 [0.876, 1.25]    | 0.947 [0.255, 1.68]      | 208 [200, 218] |
| 33   | 92278 | 6709              | 8.07 [1.76, 8.9]  | 3.47 [1.33, 4.79] | 14 [11.6, 22.8]         | 0.566 [0.339, 0.823]    | 0.0544 [0.0438, 0.0687] | 1.38 [1.29, 1.47]    | 1.05 [0.999, 1.09]       | 245 [240, 254] |
| 34   | 60088 | 19921             | 1.4 [1.06, 2.19]  | 5.27 [4.15, 5.92] | 14.7 [13.1, 17]         | 0.184 [0.0242, 0.522]   | 0.0265 [0.0212, 0.0312] | 1.41 [1.38, 1.53]    | 1.02 [0.97, 1.06]        | 241 [237, 248] |
| 35   | 9180  | 13848             | 14.2 [14, 14.3]   | 3.49 [3.04, 3.94] | 5 [4.31, 5.68]          | 0.335 [0.204, 0.504]    | 0.0158 [0.0137, 0.0183] | 1.88 [1.83, 1.92]    | 0.344 [0.272, 0.436]     | 192 [189, 199] |
| 36   | 83648 | 5215              | 21.6 [20.5, 22.7] | 6.69 [5.06, 8]    | 7.8 [6.07, 9.98]        | 0.227 [0.0723, 0.485]   | 0.116 [0.0834, 0.15]    | 1.29 [1.23, 1.39]    | 1.03 [0.984, 1.09]       | 221 [216, 229] |
| 37   | 66442 | 15515             | 2.86 [1.93, 3.49] | 4.6 [4.04, 5.76]  | 11.7 [8.14, 14.2]       | 0.721 [0.492, 0.983]    | 0.0177 [0.0142, 0.0223] | 1.49 [1.36, 1.57]    | 0.838 [0.594, 0.958]     | 231 [226, 238] |
| 38   | 36112 | 8100              | 15.1 [13.1, 16.4] | 1.54 [1.05, 2.89] | 22.8 [20.2, 24.8]       | 0.0383 [0.0026, 0.171]  | 0.0591 [0.0481, 0.0748] | 1.34 [1.26, 1.41]    | 1.11 [1.09, 1.13]        | 213 [209, 221] |
| 39   | 87117 | 7567              | 22 [20.7, 23]     | 7.78 [6.4, 9.63]  | 3.97 [2.45, 5.41]       | 0.105 [0.0319, 0.234]   | 0.0708 [0.0577, 0.0877] | 1.31 [1.24, 1.37]    | 0.909 [0.764, 0.994]     | 179 [174, 187] |
| 40   | 96859 | 15517             | 1.58 [1.04, 3.4]  | 23.8 [22, 25.5]   | 17.8 [7.11, 36.9]       | 0.599 [0.358, 0.888]    | 0.0176 [0.0133, 0.0225] | 1.18 [1.16, 1.22]    | 1.7 [1.59, 1.89]         | 242 [238, 249] |
| 41   | 65473 | 15807             | 13.6 [2.92, 20.3] | 8.4 [1.4, 31.4]   | 3.78 [1.27, 15.2]       | 0.839 [0.547, 1.14]     | 0.0587 [0.0168, 0.725]  | 1.02 [0.931, 1.24]   | 1.33 [0.734, 1.91]       | 228 [222, 237] |
| 42   | 29152 | 4531              | 21.6 [18.8, 23.3] | 2.33 [1.08, 19.2] | 1.86 [1.06, 35.3]       | 0.182 [0.0805, 0.322]   | 0.119 [0.0814, 0.191]   | 1.15 [1.04, 1.56]    | 1.54 [1.09, 2.12]        | 161 [156, 171] |

|    |       |       |                   |                   |                   |                         |                          |                    |                      |                |
|----|-------|-------|-------------------|-------------------|-------------------|-------------------------|--------------------------|--------------------|----------------------|----------------|
| 43 | 31314 | 13860 | 4.95 [1.24, 13.6] | 6.14 [1.29, 33]   | 4.25 [1.14, 29.2] | 0.588 [0.333, 0.864]    | 0.0368 [0.0252, 0.497]   | 1.15 [0.918, 1.2]  | 1.03 [0.174, 1.36]   | 216 [210, 223] |
| 44 | 96319 | 4658  | 28.3 [21.8, 29.7] | 3.36 [1.59, 11.9] | 2.53 [1.1, 29.4]  | 0.152 [0.0717, 0.268]   | 0.0516 [0.0421, 0.134]   | 1.46 [0.866, 1.69] | 1.21 [0.288, 1.71]   | 125 [120, 134] |
| 45 | 96350 | 7185  | 20.3 [18.4, 20.6] | 2.31 [1.16, 2.93] | 6.24 [5.35, 9.64] | 0.437 [0.283, 0.641]    | 0.0257 [0.0204, 0.0309]  | 2.08 [1.96, 2.66]  | 1.19 [1.13, 1.35]    | 203 [198, 222] |
| 46 | 78843 | 3708  | 7.93 [4.99, 11.1] | 23.6 [1.33, 38.6] | 4.89 [1.12, 35.2] | 0.261 [0.0995, 0.489]   | 0.302 [0.181, 0.787]     | 1.06 [1.01, 1.11]  | 0.924 [0.133, 1.18]  | 247 [242, 254] |
| 47 | 84056 | 7961  | 5.34 [1.3, 24.8]  | 21.5 [2.13, 26.3] | 2.86 [1.44, 6.45] | 0.116 [0.000541, 0.282] | 0.0979 [0.0634, 0.511]   | 0.99 [0.845, 1.02] | 1.75 [1.5, 1.97]     | 138 [134, 145] |
| 48 | 31905 | 22656 | 12.4 [9.83, 15.8] | 27 [2.02, 34.6]   | 9.94 [1.69, 27.9] | 0.281 [0.0744, 0.645]   | 0.0133 [0.00788, 0.0183] | 1.21 [1.16, 1.52]  | 1.7 [1.02, 2.35]     | 192 [186, 206] |
| 49 | 57706 | 4670  | 7.28 [1.49, 26.3] | 2.38 [1.1, 20.5]  | 10.3 [1.22, 24.8] | 0.374 [0.245, 0.537]    | 0.0331 [0.0244, 0.0407]  | 1.78 [1.58, 3.58]  | 0.668 [0.0643, 3.34] | 158 [150, 165] |
| 50 | 71459 | 8193  | 8.53 [1.12, 13.6] | 6.29 [1.18, 14.4] | 1.68 [1.05, 7.83] | 0.28 [0.008, 0.521]     | 0.119 [0.0511, 0.426]    | 1.04 [0.978, 1.14] | 1.58 [1.15, 2.1]     | 199 [194, 208] |