**Supplementary table 1.** Clinical characteristics in total 16,368 recipients in solid organ transplantation cohort

| Characteristics          | Total recipients (N = 16,368) |
|-------------------------|--------------------------------|
| Age, years              | 49.4 ± 10.8                    |
| 20-39-year-old          | 3,050 (18.6)                   |
| 40-64-year-old          | 12,345 (75.4)                  |
| ≥ 65-year-old           | 973 (5.9)                      |
| Sex, male               | 10,605 (64.8)                  |
| Transplant organ        |                                |
| Single                  | 16,185 (98.9)                  |
| Kidney                  | 9,381 (57.3)                   |
| Liver                   | 6,066 (37.1)                   |
| Heart                   | 502 (3.1)                      |
| Lung                    | 168 (1.0)                      |
| Pancreas                | 68 (0.4)                       |
| Multi-organ             | 183 (1.1)                      |
| Kidney & pancreas       | 150 (0.9)                      |
| Kidney & liver          | 22 (0.1)                       |
| Kidney & heart          | 9 (0.04)                       |
| Liver & heart           | 1 (0.01)                       |
| Liver & lung            | 1 (0.01)                       |

Data are expressed as mean ± standard deviation or number (frequency).
### Supplementary table 2. Incidence rates of CMV disease except CMV syndrome by age groups in solid organ transplantation recipients between 2010 and 2015

| Age groups | 2010 |  |  | 2011 |  |  |  | 2012 |  |  |  | 2013 |  |  |  | 2014 |  |  |  | 2015 |  |  |  |
|------------|------|---|---|------|---|---|---|------|---|---|---|------|---|---|---|------|---|---|---|------|---|---|---|
|            | No.  | Case | IR | No.  | Case | IR | No.  | Case | IR | No.  | Case | IR | No.  | Case | IR | No.  | Case | IR | No.  | Case | IR |
| Total      |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |
| 0-9        | 50   | 1   | 2.0| 54   | 1   | 1.9| 48   | 1   | 2.1| 44   | 6   | 13.6| 59   | 9   | 15.3| 59   | 4   | 6.8 |
| 10-19      | 71   | 1   | 1.4| 70   | 1   | 1.4| 76   | 4   | 5.3| 77   | 1   | 1.3| 65   | 1   | 1.5| 66   | 1   | 1.5 |
| 20-29      | 170  | 2   | 1.2| 177  | 2   | 1.1| 166  | 1   | 0.6| 145  | 5   | 3.5| 166  | 4   | 2.4| 163  | 5   | 3.1 |
| 30-39      | 346  | 5   | 1.5| 433  | 3   | 0.7| 395  | 5   | 1.3| 456  | 4   | 0.9| 378  | 11  | 2.9| 403  | 10  | 2.5 |
| 40-49      | 659  | 8   | 1.2| 787  | 4   | 0.5| 874  | 14  | 1.6| 751  | 14  | 1.9| 807  | 13  | 1.6| 829  | 7   | 0.8 |
| 50-59      | 795  | 7   | 0.9| 1008 | 12  | 1.2| 1105 | 16  | 1.5| 1073 | 17  | 1.6| 1148 | 21  | 1.8| 1306 | 21  | 1.6 |
| 60-69      | 261  | 7   | 2.7| 314  | 2   | 0.6| 381  | 3   | 0.8| 395  | 13  | 3.3| 485  | 10  | 2.1| 528  | 5   | 1.0 |
| 70-79      | 8    | 0   | —  | 15   | 0   | —  | 27   | 1   | 3.7| 30   | 0   | —  | 34   | 0   | —  | 54   | 0   | —  |
| Male       |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |      |      |    |
| 0-9        | 25   | 1   | 4.0| 26   | 1   | 3.9| 21   | 1   | 4.8| 21   | 2   | 9.5| 28   | 2   | 7.1| 28   | 1   | 3.6 |
| 10-19      | 39   | 1   | 2.6| 38   | 0   | —  | 45   | 1   | 2.2| 41   | 1   | 2.4| 31   | 0   | —  | 38   | 1   | 2.6 |
| 20-29      | 96   | 1   | 1.1| 94   | 1   | 1.1| 95   | 0   | —  | 80   | 2   | 2.5| 87   | 1   | 1.2| 74   | 3   | 4.1 |
| 30-39      | 197  | 3   | 1.5| 239  | 2   | 0.8| 226  | 3   | 1.3| 263  | 2   | 0.8| 219  | 9   | 4.1| 225  | 6   | 2.7 |
| 40-49      | 436  | 5   | 1.2| 526  | 3   | 0.6| 566  | 6   | 1.1| 481  | 6   | 1.3| 514  | 7   | 1.4| 552  | 6   | 1.1 |
| 50-59      | 564  | 6   | 1.1| 724  | 5   | 0.7| 745  | 10  | 1.3| 739  | 8   | 1.1| 763  | 8   | 1.1| 926  | 10  | 1.1 |
| 60-69      | 176  | 4   | 2.3| 195  | 1   | 0.5| 249  | 0   | 0  | 237  | 9   | 3.8| 324  | 5   | 1.54| 360  | 3   | 0.8 |
| 70-79      | 5    | 0   | —  | 11   | 0   | —  | 18   | 1   | 5.6| 22   | 0   | —  | 20   | 0   | —  | 34   | 0   | —  |
| Female | No. | CMV | IR |
|--------|-----|-----|----|
| 0-9    | 25  | 0   |    |
| 10-19  | 32  | 3   | 2.9|
| 20-29  | 74  | 1   | 1.4|
| 30-39  | 149 | 2   | 1.3|
| 40-49  | 223 | 3   | 1.4|
| 50-59  | 231 | 1   | 0.4|
| 60-69  | 85  | 3   | 2.5|
| 70-79  | 3   | 0   |    |

No. and case means the total SOT recipients and CMV cases, respectively. IR indicates the unadjusted crude rates per 100 person-years. *Indicate CMV disease except CMV syndrome. Aberrations: CMV, cytomegalovirus; IR, incidence rate; SOT, solid organ transplantation.
**Supplementary table 3.** Incidence rates of CMV disease except CMV syndrome by age groups in hematopoietic stem cell transplantation recipients between 2010 and 2015

| Age groups | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------------|------|------|------|------|------|------|
|            | No.  | Casea | IR   | No.  | Casea | IR   | No.  | Casea | IR   | No.  | Casea | IR   | No.  | Casea | IR   | No.  | Casea | IR   |
| Total      |      |       |      |      |       |      |      |       |      |      |       |      |      |       |      |      |       |      |
| 0-9        | 70   | 1     | 1.4  | 82   | 0     | —    | 88   | 0     | —    | 72   | 0     | —    | 61   | 0     | —    | 85   | 0     | —    |
| 10-19      | 182  | 0     | —    | 243  | 1     | 0.4  | 238  | 0     | —    | 252  | 1     | 0.4  | 223  | 0     | —    | 264  | 2     | 0.8  |
| 20-29      | 185  | 0     | —    | 224  | 0     | —    | 243  | 3     | 1.2  | 245  | 0     | —    | 255  | 1     | 0.4  | 288  | 5     | 1.7  |
| 30-39      | 247  | 0     | —    | 255  | 0     | —    | 282  | 1     | 0.4  | 290  | 1     | 0.3  | 309  | 3     | 1.0  | 325  | 2     | 0.6  |
| 40-49      | 280  | 0     | —    | 340  | 0     | —    | 345  | 1     | 0.3  | 353  | 1     | 0.3  | 375  | 2     | 0.5  | 432  | 3     | 0.7  |
| 50-59      | 216  | 3     | 1.4  | 263  | 1     | 0.4  | 311  | 2     | 0.6  | 356  | 0     | —    | 415  | 4     | 1.0  | 494  | 1     | 0.2  |
| 60-69      | 74   | 0     | —    | 105  | 0     | —    | 121  | 0     | —    | 155  | 2     | 1.3  | 207  | 1     | 0.5  | 267  | 3     | 1.1  |
| 70-79      | 8    | 0     | —    | 7    | 0     | —    | 10   | 0     | —    | 17   | 0     | —    | 17   | 0     | —    | 21   | 0     | —    |
| Male       |      |       |      |      |       |      |      |       |      |      |       |      |      |       |      |      |       |      |
| 0-9        | 41   | 0     | —    | 51   | 0     | —    | 47   | 0     | —    | 36   | 0     | —    | 35   | 0     | —    | 54   | 0     | —    |
| 10-19      | 113  | 0     | —    | 145  | 1     | 0.7  | 154  | 0     | —    | 148  | 0     | —    | 130  | 0     | —    | 154  | 0     | —    |
| 20-29      | 94   | 0     | —    | 116  | 0     | —    | 122  | 1     | 0.8  | 133  | 0     | —    | 135  | 0     | —    | 157  | 3     | 1.9  |
| 30-39      | 123  | 0     | —    | 121  | 0     | —    | 133  | 1     | 0.8  | 141  | 1     | 0.7  | 151  | 1     | 0.7  | 148  | 2     | 1.4  |
| 40-49      | 145  | 0     | —    | 182  | 0     | —    | 189  | 1     | 0.5  | 200  | 1     | 0.5  | 206  | 0     | —    | 235  | 1     | 0.4  |
| 50-59      | 105  | 1     | 1.0  | 128  | 0     | —    | 149  | 0     | —    | 176  | 0     | —    | 198  | 2     | 1.0  | 253  | 1     | 0.4  |
| 60-69      | 42   | 0     | —    | 56   | 0     | —    | 57   | 0     | —    | 72   | 1     | 1.4  | 102  | 0     | —    | 138  | 3     | 2.2  |
| 70-79      | 3    | 0     | —    | 2    | 0     | —    | 4    | 0     | —    | 7    | 0     | —    | 6    | 0     | —    | 7    | 0     | —    |
| Female | No. | Case Mean | No. and Case Means | IR | No. | Case Mean | No. and Case Means | IR | No. | Case Mean | No. and Case Means | IR |
|--------|-----|-----------|--------------------|----|-----|-----------|--------------------|----|-----|-----------|--------------------|----|
| 0-9    | 29  | 1 3.5     | 31 0 —             | 41 | 0  — | 36 0 —     | 26 0 —             | 31 | 0  — | 69 0 —     | 104 1 1.0          | 93 | 0  — |
| 10-19  | 69  | 0 —       | 98 0 —             | 84 | 0  — | 104 1 1.0 | 93 0 —             | 110| 2  1.8 |
| 20-29  | 91  | 0 —       | 108 0 —            | 121| 2  1.7| 112 0 —    | 120 1 0.8          | 131| 2  1.5 |
| 30-39  | 124 | 0 —       | 134 0 —            | 149| 0  — | 149 0 —    | 158 2 1.3          | 177| 0  — | 135 0 —    | 156 0 —            | 153| 0  — |
| 40-49  | 135 | 0 —       | 158 0 —            | 156| 0  — | 153 0 —    | 169 2 1.2          | 197| 2  1.0 |
| 50-59  | 111 | 2 1.8     | 135 1 0.7          | 162| 2  1.2| 180 0 —    | 217 2 0.9          | 241| 0  — | 60-69 0 —  | 64 0 —             | 83 1 1.2 |
| 60-69  | 32  | 0 —       | 49 0 —             | 64 | 0  — | 105 1 1.0 | 129 0 —            | 141| 0  — |
| 70-79  | 5   | 0 —       | 5 0 —              | 6  | 0  — | 11 0 —     | 14 0 —             | 141| 0  — |

No. and case means the total HSCT recipients and CMV cases, respectively. IR indicates the unadjusted crude rates per 100 person-years.

*Indicate CMV disease except CMV syndrome. Aberrations: CMV, cytomegalovirus; HSCT, hematopoietic stem cell transplantation; IR, incidence rate
Supplementary Figure 1. Kaplan-Meier curves for development of CMV disease except CMV syndrome within 1 year after transplantation in solid organ transplant recipients

(A) Total SOT recipients
(B) By transplant organs

- Heart
- Multi-organ
- Kidney
- Lung
- Pancreas
- Liver

Incidence probability (%)

Follow-up duration (Months)