**Supplementary Appendix**

**Supplementary Tables**

**Supplementary Table 1: Parameters for input into tree diagram**

|  |  |  |
| --- | --- | --- |
| Parameter | Estimate | Distribution used (α,β) |
| Probability of infection type1,2 |
| SEP | 0.303 | Beta (141.4, 325.6) |
| PN | 0.217 | Beta (101.6, 365.4) |
| SSI | 0.183 | Beta (85.4, 380.5) |
| BSI | 0.085 | Beta (39.8, 427.0) |
| IAI  | 0.060 | Beta (27.9, 439.1) |
| Probability of death in current admission2 |  |
| SEP | 0.261 | Beta (36.5, 103.5) |
| PN | 0.422 | Beta (42.2, 57.8) |
| SSI | 0.174 | Beta (14.7, 69.3) |
| BSI | 0.250 | Beta (9.5, 28.5) |
| IAI  | 0.357 | Beta (9.3, 16.7) |
| OTH | 0.389 | Beta (6.2, 9.8) |
| Mean (sd) excess length of stay in patients who died in current admission (days)2 |
| SEP | 0.26 (0.19) | Gamma (2.0, 7.7) |
| PN | 1.19 (0.35) | Gamma (11.5, 9.6) |
| SSI | 0.84 (0.45) | Gamma (3.5, 4.2) |
| BSI | 1.30 (0.66) | Gamma (3.9, 3.0) |
| IAI  | 0.76 (0.59) | Gamma (1.7, 2.2) |
| OTH | 2.04 (0.91) | Gamma (5.0, 2.2) |
| Mean (sd) excess length of stay in patients who did not die in current admission (days)2 |
| SEP | 0.26 (0.19) | Gamma (3.5, 4.8) |
| PN | 1.19 (0.35) | Gamma (14.8, 7.5) |
| SSI | 0.84 (0.45) | Gamma (22.3, 5.9) |
| BSI | 1.30 (0.66) | Gamma (9.5, 3.0) |
| IAI  | 0.76 (0.59) | Gamma (4.7, 2.1) |
| OTH | 2.04 (0.91) | Gamma (4.7, 1.6) |
| Mean (sd) cost of a single bed day based on accounting cost (2019 SGD)*a* |
| ICU | 902.06 (281.89) | Gamma (16.0, 0) |
| Single-bedded | 410.88 (128.40) | Gamma (16.0, 0) |
| 2-to-4-bedded | 268.78 (83.90) | Gamma (16.0, 0) |
| 5-to-6-bedded | 231.12 (84.00) | Gamma (16.0, 0.1) |
| 7-to-9-bedded | 196.88 (61.53) | Gamma (16.0, 0.1) |

BSI, catheter-related bloodstream infection and bloodstream infection of unknown source; ICU, intensive care unit; HAI, healthcare-associated infection; IAIs, gastrointestinal and intraabdominal infections; PN, pneumonia and other lower respiratory tract infections; SD, standard deviation; SEP, unspecified sepsis; SSI, surgical site infections; OTH, other HAIs

*a*Obtained by applying a cost-to-charge ratio to the base charge of each room type

**Supplementary Table 2. Median burden, bed-days lost and costs associated with HAIs in Singapore public acute care hospitals in 2019**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Category** | **Incidence/burden of HAIs** |  | **Bed-days associated with HAIs** |  | **Costs of HAIs (2019 SGD)** |
| Median incidence of HAIs per 10,000 patients (IQR) | Median annual burden of HAIs (IQR) |  | Median excess bed day per HAI (IQR) | Median excess bed-days of HAIs (IQR) |  | Median cost of a single HAI (IQR) | Median annual cost of HAIs (IQR) |
| All HAIs | 1,598 (1,554 – 1,645) | 83,993 (81,635 – 86,430) |  | 1.84 (1.69 – 2.01) | 155,526 (141,814 – 169,254) |  | 1,762 (1,492 – 2,064) |  148,473,069 (125,857,807 – 173,715,660) |
| SEP | 484 (456 – 511) | 25,419 (23,971 – 26,867) |  | 0.57 (0.40 – 0.78) | 14,521 (10,077 – 19,876) |  | 1,300 (1,036 – 1,584) |  32,953,978 (26,427,071 – 40,555,330) |
| PN | 348 (323 – 370) | 18,264 (16,987 – 19,435) |  | 1.60 (1.40 – 1.83) | 28,949 (24,981 – 33,319) |  | 1,687 (1,398 – 1,976) |  30,666,180 (25,340,085 – 36,197,027)  |
| SSI | 291 (271 – 312) | 15,273 (14,243 – 16,393) |  | 3.22 (2.82 – 3.70) | 49,098 (41,979 – 57,488) |  | 2,289 (1,977 – 2,643) |  34,728,196 (29,978,841 – 41,082,852) |
| BSI | 134 (120 – 151) | 7,015 (6,320 – 7,941) |  | 2.57 (2.08 – 3.13) | 17,837 (14,438 – 22,244) |  | 2,033 (1,726 – 2,440) |  14,518,339 (11,708,281 – 17,538,772) |
| IAI  | 93 (82 – 108) | 4,911 (4,331 – 5,689) |  | 1.65 (1.16 – 2.14) | 8,051 (5,632 – 10,738) |  | 1,686 (1,400 – 2,048) |  8,312,036 (6,557,552 – 10,486,672) |
| OTH | 242 (203 – 287) | 12,719 (10,677 – 15,073) |  | 2.46 (1.89 – 3.09) | 30,742 (22,299 – 41,236) |  | 2,013 (1,667 – 2,427) | 25,434,383 (19,087,741 – 32,529,797) |

BSI, catheter-related bloodstream infection and bloodstream infection of unknown source; HAI, healthcare-associated infection; IAIs, gastrointestinal and intraabdominal infections; IQR, interquartile range; PN, pneumonia and other lower respiratory tract infections; SEP, unspecified sepsis; SGD, Singapore dollars; SSI, surgical site infections; OTH, other HAIs

**Supplementary Figures**

**Supplementary Figure 1: Tree diagram for HAIs.** Each patient in the tree diagram had the probability of not developing a HAI, or had probability of developing one of the six infection types, each associated with its own probability of death.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  | Live  |
|  |  | Unspecified sepsis (SEP) |  |  |
|  |  |  |  |
|  |  |  |  | Dead |
|  |  |  |  |  |
|  |  |  |  | Live |
|  |  | Pneumonia and other lower respiratory infection (PN) |  |  |
|  |  |  |  |
|  |  |  | Dead |
|  |  |  |  |  |
|  |  |  |  | Live |
|  | Surgical site infection (SSI) |  |  |
| Healthcare associated infection(HAI) |  |  |
|  |  |  | Dead |
|  |  |  |  |
|  |  |  | Live |
|  | Line infection and bloodstream infection of unknown source (BSI) |  |  |
|  |  |  |
|  |  | Dead |
|  |  |  |
|  |  |  | Live |
|  |  | Gastro-intestinal and intra-abdominal infection (IAI) |  |  |
|  |  |  |  |
| Admitted  |  |  | Dead |
| patient |  |  |  |  |
|  |  |  |  | Live |
|  |  | Others (OTH) |  |  |
|  |  |  |  |
|  |  |  |  | Dead |
|  |  |  |  |  |
|  | No HAI | Live |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  | Dead |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

BSI, catheter-related bloodstream infection and bloodstream infection of unknown source; HAI, healthcare-associated infection; IAIs, gastrointestinal and intraabdominal infections; PN, pneumonia and other lower respiratory tract infections; SEP, unspecified sepsis; SGD, Singapore dollars; SSI, surgical site infections; OTH, other HAIs

**References for Supplementary Appendix**

**1.** Cai Y, Venkatachalam I, Tee NW, et al. Prevalence of Healthcare-Associated Infections and Antimicrobial Use Among Adult Inpatients in Singapore Acute-Care Hospitals: Results From the First National Point Prevalence Survey. *Clin Infect Dis* 2017;64:S61-S67.

**2.** Cai Y, Lo JJ, Venkatachalam I, et al. The impact of healthcare associated infections on mortality and length of stay in Singapore-A time-varying analysis. *Infect Control Hosp Epidemiol* 2020:1-6.