**Supplemental Table 1.** Key simulation parameters used in this study.

|  |  |
| --- | --- |
| **Parameters** | **Input** |
| Number of staff per shift | 5, 10, 20, 30 |
| Number of shifts per day | 1, 2, 3 |
| Total number of staff (expressed as multiples of staff in the first shift) | 2, 4, 6 |
| Frequency of shift change | After 1 day, as well as after 3, 7, 14 consecutive days |
| Secondary attack rates | 5%, 15%, 30% |
| Average number of staff contact per shift in Poisson distribution, *c*, under base model | 40% of the number of staff in the same shift |
| Average number of staff contact per shift in Poisson distribution, *c*, under social distancing model | 20% of the number of staff in the same shift |
| Duration of simulation when outcome is examined (days) | 7, 14 and 21 |
|  |  |
| *Protective measures* | *Odds ratio* |
| Wearing gloves | 0.45 |
| Wearing surgical mask | 0.32 |
| Wearing gown | 0.23 |
| Wearing N95 mask | 0.09 |

**Supplemental Table 2.** Proportion of simulated laboratory staff infected by COVID-19 in base scenario with 15% probability of secondary infection at the end of day 7, day 14 and day 21 of the simulation. In this base scenario, the simulated staff worked fixed alternating workdays (i.e. fixed consecutive days on, and fixed minimum consecutive days off). The results shown are the median of 100 cycles of simulation. NA = not available as the number of staff per shift is too low to simulate under the required conditions.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Total number of staff strength | |  | 2 | | | | | 4 | | | | | 6 | | | | |
| End of Day 7 | Freq. of staff change, days |  | 1 | 3 | 7 | 14 | 21 | 1 | 3 | 7 | 14 | 21 | 1 | 3 | 7 | 14 | 21 |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.20 | 0.20 | 0.30 | 0.40 | 0.30 | 0.10 | 0.10 | 0.20 | 0.20 | 0.15 | 0.03 | 0.05 | 0.13 | 0.10 | 0.13 |
|  |  | 10 | 0.20 | 0.25 | 0.40 | 0.43 | 0.45 | 0.07 | 0.10 | 0.20 | 0.20 | 0.20 | 0.03 | 0.05 | 0.15 | 0.13 | 0.15 |
|  |  | 20 | 0.31 | 0.33 | 0.50 | 0.50 | 0.50 | 0.07 | 0.11 | 0.25 | 0.25 | 0.25 | 0.03 | 0.08 | 0.17 | 0.17 | 0.17 |
|  |  | 30 | 0.41 | 0.40 | 0.50 | 0.50 | 0.50 | 0.09 | 0.16 | 0.25 | 0.25 | 0.25 | 0.05 | 0.11 | 0.17 | 0.17 | 0.17 |
| 2 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.10 | 0.15 | 0.20 | 0.20 | 0.03 | 0.07 | 0.10 | 0.13 | 0.13 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.07 | 0.10 | 0.20 | 0.21 | 0.20 | 0.03 | 0.07 | 0.15 | 0.15 | 0.13 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.09 | 0.14 | 0.25 | 0.25 | 0.25 | 0.05 | 0.08 | 0.17 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.15 | 0.18 | 0.25 | 0.25 | 0.25 | 0.05 | 0.09 | 0.17 | 0.17 | 0.17 |
| 3 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.10 | 0.10 | 0.15 | 0.20 | 0.15 | 0.03 | 0.07 | 0.13 | 0.10 | 0.10 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.07 | 0.10 | 0.20 | 0.20 | 0.23 | 0.03 | 0.05 | 0.13 | 0.13 | 0.13 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.12 | 0.15 | 0.25 | 0.25 | 0.25 | 0.04 | 0.08 | 0.17 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.17 | 0.22 | 0.25 | 0.25 | 0.25 | 0.06 | 0.11 | 0.17 | 0.17 | 0.17 |
| End of Day 14 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.30 | 0.40 | 0.30 | 0.50 | 0.50 | 0.10 | 0.15 | 0.20 | 0.25 | 0.25 | 0.07 | 0.07 | 0.13 | 0.17 | 0.17 |
|  |  | 10 | 0.40 | 0.45 | 0.40 | 0.50 | 0.50 | 0.17 | 0.21 | 0.20 | 0.25 | 0.25 | 0.05 | 0.10 | 0.15 | 0.17 | 0.17 |
|  |  | 20 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.26 | 0.42 | 0.25 | 0.25 | 0.25 | 0.10 | 0.24 | 0.17 | 0.17 | 0.17 |
|  |  | 30 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.48 | 0.61 | 0.25 | 0.25 | 0.25 | 0.19 | 0.39 | 0.17 | 0.17 | 0.17 |
| 2 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.15 | 0.15 | 0.15 | 0.25 | 0.25 | 0.07 | 0.10 | 0.10 | 0.17 | 0.17 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.17 | 0.25 | 0.20 | 0.25 | 0.25 | 0.07 | 0.12 | 0.15 | 0.17 | 0.17 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.41 | 0.46 | 0.25 | 0.25 | 0.25 | 0.13 | 0.28 | 0.17 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.66 | 0.63 | 0.25 | 0.25 | 0.25 | 0.25 | 0.41 | 0.17 | 0.17 | 0.17 |
| 3 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.15 | 0.20 | 0.15 | 0.25 | 0.25 | 0.07 | 0.10 | 0.13 | 0.17 | 0.17 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.20 | 0.25 | 0.20 | 0.25 | 0.25 | 0.08 | 0.10 | 0.13 | 0.17 | 0.17 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.53 | 0.46 | 0.25 | 0.25 | 0.25 | 0.15 | 0.29 | 0.17 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.78 | 0.63 | 0.25 | 0.25 | 0.25 | 0.34 | 0.46 | 0.17 | 0.17 | 0.17 |
| End of Day 21 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.40 | 0.50 | 0.50 | 0.50 | 0.50 | 0.20 | 0.20 | 0.30 | 0.25 | 0.25 | 0.08 | 0.10 | 0.13 | 0.17 | 0.17 |
|  |  | 10 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.34 | 0.45 | 0.38 | 0.25 | 0.25 | 0.10 | 0.17 | 0.25 | 0.17 | 0.17 |
|  |  | 20 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.63 | 0.73 | 0.41 | 0.25 | 0.25 | 0.24 | 0.47 | 0.29 | 0.17 | 0.17 |
|  |  | 30 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.88 | 0.82 | 0.42 | 0.25 | 0.25 | 0.50 | 0.62 | 0.30 | 0.17 | 0.17 |
| 2 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.20 | 0.23 | 0.30 | 0.25 | 0.25 | 0.10 | 0.13 | 0.17 | 0.17 | 0.17 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.41 | 0.47 | 0.38 | 0.25 | 0.25 | 0.12 | 0.22 | 0.27 | 0.17 | 0.17 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.82 | 0.79 | 0.45 | 0.25 | 0.25 | 0.36 | 0.53 | 0.33 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.97 | 0.90 | 0.47 | 0.25 | 0.25 | 0.64 | 0.69 | 0.34 | 0.17 | 0.17 |
| 3 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.30 | 0.25 | 0.30 | 0.25 | 0.25 | 0.10 | 0.13 | 0.17 | 0.17 | 0.17 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.45 | 0.47 | 0.40 | 0.25 | 0.25 | 0.17 | 0.21 | 0.27 | 0.17 | 0.17 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.93 | 0.78 | 0.49 | 0.25 | 0.25 | 0.40 | 0.58 | 0.37 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.99 | 0.93 | 0.49 | 0.25 | 0.25 | 0.80 | 0.78 | 0.39 | 0.17 | 0.17 |

**Supplemental Table 3.** Proportion of simulated laboratory staff infected by COVID-19 in base scenario with 5% probability of secondary infection at the end of day 7, day 14 and day 21 of the simulation. In this scenario, the simulated staff worked fixed alternating workdays (i.e. fixed consecutive days on, and fixed minimum consecutive days off). The results shown are the median of 100 cycles of simulation. NA = not available as the number of staff per shift was too low to simulate under the required conditions.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Total number of staff strength | |  | 2 | | | | | 4 | | | | | 6 | | | | |
| End of Day 7 | Freq. of staff change, days |  | 1 | 3 | 7 | 14 | 21 | 1 | 3 | 7 | 14 | 21 | 1 | 3 | 7 | 14 | 21 |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.10 | 0.10 | 0.20 | 0.10 | 0.20 | 0.05 | 0.05 | 0.10 | 0.05 | 0.05 | 0.03 | 0.03 | 0.07 | 0.07 | 0.03 |
|  |  | 10 | 0.10 | 0.10 | 0.15 | 0.12 | 0.15 | 0.03 | 0.03 | 0.07 | 0.05 | 0.07 | 0.02 | 0.02 | 0.03 | 0.05 | 0.03 |
|  |  | 20 | 0.07 | 0.07 | 0.20 | 0.17 | 0.17 | 0.03 | 0.04 | 0.07 | 0.07 | 0.07 | 0.02 | 0.02 | 0.05 | 0.05 | 0.06 |
|  |  | 30 | 0.08 | 0.08 | 0.23 | 0.23 | 0.23 | 0.02 | 0.03 | 0.12 | 0.12 | 0.12 | 0.01 | 0.02 | 0.09 | 0.08 | 0.08 |
| 2 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.08 | 0.10 | 0.05 | 0.03 | 0.03 | 0.07 | 0.07 | 0.07 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.03 | 0.05 | 0.07 | 0.05 | 0.07 | 0.02 | 0.02 | 0.05 | 0.03 | 0.03 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.03 | 0.03 | 0.09 | 0.09 | 0.07 | 0.02 | 0.03 | 0.05 | 0.06 | 0.06 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.03 | 0.03 | 0.12 | 0.11 | 0.12 | 0.01 | 0.02 | 0.09 | 0.08 | 0.09 |
| 3 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.10 | 0.10 | 0.10 | 0.03 | 0.03 | 0.03 | 0.03 | 0.07 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.03 | 0.05 | 0.05 | 0.06 | 0.07 | 0.02 | 0.02 | 0.05 | 0.05 | 0.05 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.03 | 0.04 | 0.08 | 0.07 | 0.09 | 0.02 | 0.03 | 0.06 | 0.06 | 0.06 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.03 | 0.03 | 0.12 | 0.12 | 0.14 | 0.01 | 0.02 | 0.08 | 0.07 | 0.08 |
| End of Day 14 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.10 | 0.20 | 0.20 | 0.30 | 0.30 | 0.05 | 0.05 | 0.10 | 0.10 | 0.10 | 0.03 | 0.03 | 0.07 | 0.10 | 0.07 |
|  |  | 10 | 0.15 | 0.15 | 0.15 | 0.30 | 0.35 | 0.05 | 0.05 | 0.07 | 0.15 | 0.15 | 0.02 | 0.03 | 0.03 | 0.10 | 0.10 |
|  |  | 20 | 0.17 | 0.20 | 0.20 | 0.45 | 0.45 | 0.04 | 0.06 | 0.07 | 0.22 | 0.21 | 0.02 | 0.03 | 0.05 | 0.15 | 0.15 |
|  |  | 30 | 0.23 | 0.30 | 0.23 | 0.50 | 0.49 | 0.05 | 0.07 | 0.12 | 0.25 | 0.24 | 0.02 | 0.04 | 0.09 | 0.16 | 0.16 |
| 2 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.08 | 0.10 | 0.10 | 0.03 | 0.03 | 0.07 | 0.10 | 0.08 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.07 | 0.15 | 0.15 | 0.03 | 0.03 | 0.05 | 0.10 | 0.10 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.05 | 0.07 | 0.09 | 0.23 | 0.21 | 0.03 | 0.03 | 0.05 | 0.14 | 0.15 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.06 | 0.11 | 0.12 | 0.24 | 0.25 | 0.02 | 0.05 | 0.09 | 0.16 | 0.17 |
| 3 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.10 | 0.10 | 0.15 | 0.03 | 0.03 | 0.03 | 0.07 | 0.07 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.05 | 0.06 | 0.05 | 0.15 | 0.15 | 0.03 | 0.03 | 0.05 | 0.10 | 0.10 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.05 | 0.09 | 0.08 | 0.23 | 0.24 | 0.03 | 0.04 | 0.06 | 0.15 | 0.15 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.09 | 0.11 | 0.12 | 0.25 | 0.25 | 0.03 | 0.05 | 0.08 | 0.17 | 0.16 |
| End of Day 21 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.20 | 0.20 | 0.20 | 0.30 | 0.40 | 0.05 | 0.05 | 0.10 | 0.10 | 0.20 | 0.03 | 0.03 | 0.07 | 0.10 | 0.10 |
|  |  | 10 | 0.25 | 0.30 | 0.30 | 0.30 | 0.45 | 0.05 | 0.07 | 0.07 | 0.15 | 0.23 | 0.03 | 0.03 | 0.04 | 0.10 | 0.15 |
|  |  | 20 | 0.33 | 0.38 | 0.45 | 0.45 | 0.50 | 0.07 | 0.11 | 0.21 | 0.22 | 0.25 | 0.03 | 0.04 | 0.11 | 0.15 | 0.17 |
|  |  | 30 | 0.45 | 0.47 | 0.49 | 0.50 | 0.50 | 0.12 | 0.17 | 0.30 | 0.25 | 0.25 | 0.04 | 0.08 | 0.20 | 0.16 | 0.17 |
| 2 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.10 | 0.10 | 0.15 | 0.03 | 0.03 | 0.07 | 0.10 | 0.13 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.05 | 0.07 | 0.12 | 0.15 | 0.23 | 0.03 | 0.03 | 0.07 | 0.10 | 0.15 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.10 | 0.13 | 0.25 | 0.23 | 0.25 | 0.03 | 0.05 | 0.12 | 0.14 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.14 | 0.26 | 0.33 | 0.24 | 0.25 | 0.05 | 0.10 | 0.22 | 0.16 | 0.17 |
| 3 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.10 | 0.10 | 0.10 | 0.10 | 0.20 | 0.03 | 0.03 | 0.07 | 0.07 | 0.10 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.07 | 0.10 | 0.12 | 0.15 | 0.23 | 0.03 | 0.03 | 0.07 | 0.10 | 0.13 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.11 | 0.18 | 0.25 | 0.23 | 0.25 | 0.04 | 0.07 | 0.14 | 0.15 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.23 | 0.28 | 0.35 | 0.25 | 0.25 | 0.06 | 0.11 | 0.22 | 0.17 | 0.17 |

**Supplemental Table 4.** Proportion of simulated laboratory staff infected by COVID-19 in base scenario with 30% probability of secondary infection at the end of day 7, day 14 and day 21 of the simulation. In this scenario, the simulated staff worked fixed alternating workdays (i.e. fixed consecutive days on, and fixed minimum consecutive days off). The results shown are the median of 100 cycles of simulation. NA = not available as the number of staff per shift was too low to simulate under the required conditions.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Total number of staff strength | |  | 2 | | | | | 4 | | | | | 6 | | | | |
| End of Day 7 | Freq. of staff change, days |  | 1 | 3 | 7 | 14 | 21 | 1 | 3 | 7 | 14 | 21 | 1 | 3 | 7 | 14 | 21 |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.40 | 0.30 | 0.50 | 0.50 | 0.50 | 0.10 | 0.20 | 0.25 | 0.25 | 0.25 | 0.07 | 0.10 | 0.17 | 0.17 | 0.17 |
|  |  | 10 | 0.43 | 0.45 | 0.50 | 0.50 | 0.50 | 0.12 | 0.21 | 0.25 | 0.25 | 0.25 | 0.07 | 0.12 | 0.17 | 0.17 | 0.17 |
|  |  | 20 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.25 | 0.30 | 0.25 | 0.25 | 0.25 | 0.10 | 0.19 | 0.17 | 0.17 | 0.17 |
|  |  | 30 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.35 | 0.35 | 0.25 | 0.25 | 0.25 | 0.14 | 0.22 | 0.17 | 0.17 | 0.17 |
| 2 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.15 | 0.20 | 0.25 | 0.25 | 0.25 | 0.07 | 0.10 | 0.17 | 0.17 | 0.17 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.16 | 0.23 | 0.25 | 0.25 | 0.25 | 0.08 | 0.13 | 0.17 | 0.17 | 0.17 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.26 | 0.31 | 0.25 | 0.25 | 0.25 | 0.12 | 0.19 | 0.17 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.44 | 0.38 | 0.25 | 0.25 | 0.25 | 0.19 | 0.24 | 0.17 | 0.17 | 0.17 |
| 3 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.15 | 0.15 | 0.25 | 0.25 | 0.25 | 0.07 | 0.10 | 0.17 | 0.17 | 0.17 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.21 | 0.25 | 0.25 | 0.25 | 0.25 | 0.08 | 0.13 | 0.17 | 0.17 | 0.17 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.36 | 0.34 | 0.25 | 0.25 | 0.25 | 0.16 | 0.20 | 0.17 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.48 | 0.40 | 0.25 | 0.25 | 0.25 | 0.22 | 0.25 | 0.17 | 0.17 | 0.17 |
| End of Day 14 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.25 | 0.30 | 0.25 | 0.25 | 0.25 | 0.12 | 0.17 | 0.17 | 0.17 | 0.17 |
|  |  | 10 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.47 | 0.55 | 0.25 | 0.25 | 0.25 | 0.19 | 0.32 | 0.17 | 0.17 | 0.17 |
|  |  | 20 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.81 | 0.71 | 0.25 | 0.25 | 0.25 | 0.42 | 0.51 | 0.17 | 0.17 | 0.17 |
|  |  | 30 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.93 | 0.73 | 0.25 | 0.25 | 0.25 | 0.61 | 0.54 | 0.17 | 0.17 | 0.17 |
| 2 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.32 | 0.35 | 0.25 | 0.25 | 0.25 | 0.13 | 0.20 | 0.17 | 0.17 | 0.17 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.60 | 0.57 | 0.25 | 0.25 | 0.25 | 0.23 | 0.32 | 0.17 | 0.17 | 0.17 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.89 | 0.79 | 0.25 | 0.25 | 0.25 | 0.54 | 0.57 | 0.17 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.98 | 0.85 | 0.25 | 0.25 | 0.25 | 0.77 | 0.63 | 0.17 | 0.17 | 0.17 |
| 3 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.30 | 0.35 | 0.25 | 0.25 | 0.25 | 0.17 | 0.20 | 0.17 | 0.17 | 0.17 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.68 | 0.55 | 0.25 | 0.25 | 0.25 | 0.31 | 0.37 | 0.17 | 0.17 | 0.17 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.96 | 0.78 | 0.25 | 0.25 | 0.25 | 0.70 | 0.61 | 0.17 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 1.00 | 0.86 | 0.25 | 0.25 | 0.25 | 0.87 | 0.72 | 0.17 | 0.17 | 0.17 |
| End of Day 21 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.43 | 0.50 | 0.40 | 0.25 | 0.25 | 0.20 | 0.30 | 0.23 | 0.17 | 0.17 |
|  |  | 10 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.82 | 0.78 | 0.42 | 0.25 | 0.25 | 0.41 | 0.53 | 0.30 | 0.17 | 0.17 |
|  |  | 20 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.97 | 0.88 | 0.41 | 0.25 | 0.25 | 0.80 | 0.69 | 0.30 | 0.17 | 0.17 |
|  |  | 30 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 1.00 | 0.88 | 0.42 | 0.25 | 0.25 | 0.91 | 0.71 | 0.30 | 0.17 | 0.17 |
| 2 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.65 | 0.55 | 0.40 | 0.25 | 0.25 | 0.23 | 0.30 | 0.27 | 0.17 | 0.17 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.93 | 0.85 | 0.45 | 0.25 | 0.25 | 0.51 | 0.57 | 0.32 | 0.17 | 0.17 |
|  |  | 20 | NA | NA | NA | NA | NA | 1.00 | 0.95 | 0.46 | 0.25 | 0.25 | 0.90 | 0.78 | 0.35 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 1.00 | 0.97 | 0.46 | 0.25 | 0.25 | 0.97 | 0.83 | 0.35 | 0.17 | 0.17 |
| 3 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.65 | 0.50 | 0.40 | 0.25 | 0.25 | 0.30 | 0.33 | 0.27 | 0.17 | 0.17 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.95 | 0.85 | 0.47 | 0.25 | 0.25 | 0.66 | 0.65 | 0.33 | 0.17 | 0.17 |
|  |  | 20 | NA | NA | NA | NA | NA | 1.00 | 0.99 | 0.50 | 0.25 | 0.25 | 0.97 | 0.86 | 0.38 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 1.00 | 0.99 | 0.50 | 0.25 | 0.25 | 0.99 | 0.91 | 0.39 | 0.17 | 0.17 |

**Supplemental Table 5.** Proportion of simulated laboratory staff working in a single shift infected by COVID-19 in a scenario with 15% probability of secondary infection at the end of day 7, day 14 and day 21 of the simulation without predefined minimum rest day (i.e. random shift assignment after each shift). The results shown are the median of 100 cycles of simulation.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Total number of staff strength | |  | 2 | | | | | 4 | | | | | 6 | | | | |
| End of Day 7 | Freq. of staff change, days |  | 1 | 3 | 7 | 14 | 21 | 1 | 3 | 7 | 14 | 21 | 1 | 3 | 7 | 14 | 21 |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.25 | 0.30 | 0.30 | 0.30 | 0.40 | 0.10 | 0.10 | 0.15 | 0.15 | 0.15 | 0.03 | 0.07 | 0.10 | 0.13 | 0.13 |
|  |  | 10 | 0.20 | 0.35 | 0.40 | 0.40 | 0.40 | 0.07 | 0.12 | 0.20 | 0.23 | 0.23 | 0.03 | 0.08 | 0.14 | 0.15 | 0.15 |
|  |  | 20 | 0.47 | 0.62 | 0.50 | 0.50 | 0.50 | 0.09 | 0.28 | 0.25 | 0.25 | 0.25 | 0.04 | 0.15 | 0.17 | 0.17 | 0.17 |
|  |  | 30 | 0.65 | 0.73 | 0.50 | 0.50 | 0.50 | 0.15 | 0.37 | 0.25 | 0.25 | 0.25 | 0.06 | 0.24 | 0.17 | 0.17 | 0.17 |
| End of Day 14 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.10 | 0.17 | 0.20 | 0.25 | 0.25 | 0.07 | 0.10 | 0.13 | 0.17 | 0.17 |
|  |  | 10 | 0.65 | 0.75 | 0.70 | 0.50 | 0.50 | 0.17 | 0.30 | 0.38 | 0.25 | 0.25 | 0.08 | 0.17 | 0.23 | 0.17 | 0.17 |
|  |  | 20 | 0.95 | 0.93 | 0.75 | 0.50 | 0.50 | 0.41 | 0.61 | 0.42 | 0.25 | 0.25 | 0.13 | 0.38 | 0.30 | 0.17 | 0.17 |
|  |  | 30 | 0.98 | 0.95 | 0.75 | 0.50 | 0.50 | 0.62 | 0.69 | 0.43 | 0.25 | 0.25 | 0.24 | 0.51 | 0.31 | 0.17 | 0.17 |
| End of Day 21 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.80 | 0.80 | 0.70 | 0.70 | 0.50 | 0.20 | 0.25 | 0.30 | 0.35 | 0.25 | 0.08 | 0.13 | 0.13 | 0.20 | 0.17 |
|  |  | 10 | 0.95 | 0.90 | 0.85 | 0.75 | 0.50 | 0.39 | 0.51 | 0.53 | 0.42 | 0.25 | 0.13 | 0.26 | 0.33 | 0.28 | 0.17 |
|  |  | 20 | 1.00 | 0.97 | 0.88 | 0.75 | 0.50 | 0.76 | 0.78 | 0.57 | 0.44 | 0.25 | 0.34 | 0.57 | 0.42 | 0.31 | 0.17 |
|  |  | 30 | 1.00 | 0.98 | 0.87 | 0.73 | 0.50 | 0.91 | 0.82 | 0.57 | 0.44 | 0.25 | 0.59 | 0.67 | 0.42 | 0.31 | 0.17 |

**Supplemental Table 6.** Proportion of simulated laboratory staff infected by COVID-19 in base scenario with 15% probability of secondary infection at the end of day 14 of the simulation with the staff observing workplace social distancing (by reducing the contact rate by half) and using various personal protective equipment. In this scenario, the simulated staff worked fixed alternating workdays (i.e. fixed consecutive days on, and fixed minimum consecutive days off). The results shown are the median of 100 cycles of simulation. NA = not available as the number of staff per shift is too low to simulate under the required conditions.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Total number of staff strength | |  | 2 | | | | | 4 | | | | | 6 | | | | |
| Social distancing | Freq. of staff change, days |  | 1 | 3 | 7 | 14 | 21 | 1 | 3 | 7 | 14 | 21 | 1 | 3 | 7 | 14 | 21 |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.20 | 0.20 | 0.20 | 0.35 | 0.35 | 0.05 | 0.10 | 0.10 | 0.20 | 0.17 | 0.03 | 0.03 | 0.07 | 0.12 | 0.13 |
|  |  | 10 | 0.20 | 0.25 | 0.20 | 0.45 | 0.45 | 0.05 | 0.07 | 0.10 | 0.23 | 0.20 | 0.03 | 0.03 | 0.08 | 0.15 | 0.13 |
|  |  | 20 | 0.31 | 0.38 | 0.33 | 0.50 | 0.50 | 0.07 | 0.12 | 0.16 | 0.25 | 0.25 | 0.03 | 0.06 | 0.11 | 0.17 | 0.17 |
|  |  | 30 | 0.42 | 0.46 | 0.43 | 0.50 | 0.50 | 0.10 | 0.21 | 0.19 | 0.25 | 0.25 | 0.05 | 0.11 | 0.14 | 0.17 | 0.17 |
| 2 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.10 | 0.10 | 0.20 | 0.17 | 0.03 | 0.03 | 0.05 | 0.13 | 0.13 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.07 | 0.07 | 0.10 | 0.20 | 0.23 | 0.03 | 0.05 | 0.07 | 0.15 | 0.13 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.10 | 0.13 | 0.16 | 0.25 | 0.25 | 0.04 | 0.07 | 0.10 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.14 | 0.25 | 0.20 | 0.25 | 0.25 | 0.05 | 0.11 | 0.14 | 0.17 | 0.17 |
| 3 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.10 | 0.10 | 0.10 | 0.15 | 0.15 | 0.03 | 0.07 | 0.07 | 0.10 | 0.13 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.07 | 0.10 | 0.10 | 0.21 | 0.23 | 0.03 | 0.05 | 0.07 | 0.15 | 0.15 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.13 | 0.15 | 0.15 | 0.25 | 0.25 | 0.03 | 0.08 | 0.09 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.23 | 0.28 | 0.21 | 0.25 | 0.25 | 0.05 | 0.13 | 0.14 | 0.17 | 0.17 |
| Gloves |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.20 | 0.20 | 0.20 | 0.30 | 0.30 | 0.05 | 0.05 | 0.10 | 0.15 | 0.15 | 0.03 | 0.03 | 0.07 | 0.10 | 0.10 |
|  |  | 10 | 0.15 | 0.25 | 0.20 | 0.40 | 0.40 | 0.05 | 0.06 | 0.07 | 0.20 | 0.20 | 0.02 | 0.03 | 0.05 | 0.13 | 0.15 |
|  |  | 20 | 0.29 | 0.35 | 0.28 | 0.50 | 0.50 | 0.06 | 0.09 | 0.13 | 0.25 | 0.25 | 0.03 | 0.05 | 0.10 | 0.17 | 0.17 |
|  |  | 30 | 0.37 | 0.43 | 0.38 | 0.50 | 0.50 | 0.08 | 0.17 | 0.18 | 0.25 | 0.25 | 0.03 | 0.09 | 0.12 | 0.17 | 0.17 |
| 2 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.10 | 0.10 | 0.15 | 0.15 | 0.03 | 0.05 | 0.07 | 0.12 | 0.10 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.05 | 0.07 | 0.10 | 0.20 | 0.20 | 0.03 | 0.05 | 0.07 | 0.13 | 0.13 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.07 | 0.12 | 0.12 | 0.25 | 0.25 | 0.03 | 0.05 | 0.09 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.11 | 0.20 | 0.18 | 0.25 | 0.25 | 0.03 | 0.09 | 0.13 | 0.17 | 0.17 |
| 3 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.10 | 0.10 | 0.15 | 0.15 | 0.03 | 0.03 | 0.07 | 0.10 | 0.12 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.05 | 0.07 | 0.10 | 0.23 | 0.20 | 0.03 | 0.05 | 0.05 | 0.13 | 0.13 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.12 | 0.13 | 0.11 | 0.25 | 0.25 | 0.03 | 0.05 | 0.08 | 0.17 | 0.17 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.12 | 0.22 | 0.18 | 0.25 | 0.25 | 0.06 | 0.11 | 0.13 | 0.17 | 0.17 |
| Surgical mask |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.10 | 0.15 | 0.10 | 0.20 | 0.20 | 0.05 | 0.05 | 0.05 | 0.10 | 0.10 | 0.03 | 0.03 | 0.03 | 0.10 | 0.10 |
|  |  | 10 | 0.10 | 0.15 | 0.15 | 0.30 | 0.25 | 0.05 | 0.05 | 0.07 | 0.15 | 0.12 | 0.02 | 0.03 | 0.05 | 0.12 | 0.10 |
|  |  | 20 | 0.17 | 0.23 | 0.15 | 0.45 | 0.45 | 0.04 | 0.05 | 0.09 | 0.23 | 0.23 | 0.02 | 0.03 | 0.06 | 0.15 | 0.14 |
|  |  | 30 | 0.24 | 0.27 | 0.23 | 0.48 | 0.50 | 0.04 | 0.09 | 0.11 | 0.24 | 0.24 | 0.02 | 0.03 | 0.07 | 0.17 | 0.16 |
| 2 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.05 | 0.15 | 0.10 | 0.03 | 0.03 | 0.05 | 0.10 | 0.07 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.05 | 0.06 | 0.07 | 0.12 | 0.15 | 0.03 | 0.03 | 0.05 | 0.10 | 0.10 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.09 | 0.23 | 0.21 | 0.02 | 0.04 | 0.05 | 0.14 | 0.15 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.06 | 0.07 | 0.12 | 0.25 | 0.24 | 0.02 | 0.05 | 0.07 | 0.16 | 0.16 |
| 3 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.10 | 0.10 | 0.10 | 0.03 | 0.03 | 0.03 | 0.07 | 0.07 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.07 | 0.15 | 0.15 | 0.02 | 0.03 | 0.03 | 0.08 | 0.10 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.05 | 0.07 | 0.09 | 0.21 | 0.23 | 0.03 | 0.03 | 0.05 | 0.15 | 0.14 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.07 | 0.10 | 0.12 | 0.24 | 0.24 | 0.02 | 0.05 | 0.08 | 0.16 | 0.16 |
| Gown |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.10 | 0.10 | 0.10 | 0.20 | 0.20 | 0.05 | 0.05 | 0.05 | 0.10 | 0.10 | 0.03 | 0.03 | 0.03 | 0.07 | 0.07 |
|  |  | 10 | 0.10 | 0.10 | 0.10 | 0.20 | 0.20 | 0.03 | 0.05 | 0.05 | 0.10 | 0.10 | 0.02 | 0.02 | 0.03 | 0.07 | 0.07 |
|  |  | 20 | 0.10 | 0.10 | 0.10 | 0.30 | 0.31 | 0.03 | 0.04 | 0.06 | 0.14 | 0.15 | 0.02 | 0.02 | 0.03 | 0.10 | 0.10 |
|  |  | 30 | 0.13 | 0.18 | 0.12 | 0.42 | 0.42 | 0.03 | 0.04 | 0.06 | 0.21 | 0.23 | 0.01 | 0.02 | 0.04 | 0.14 | 0.14 |
| 2 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.05 | 0.10 | 0.10 | 0.03 | 0.03 | 0.03 | 0.07 | 0.07 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.05 | 0.10 | 0.10 | 0.02 | 0.02 | 0.03 | 0.07 | 0.07 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.04 | 0.04 | 0.06 | 0.16 | 0.16 | 0.02 | 0.02 | 0.03 | 0.10 | 0.10 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.03 | 0.04 | 0.07 | 0.20 | 0.22 | 0.02 | 0.02 | 0.04 | 0.14 | 0.14 |
| 3 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.05 | 0.10 | 0.10 | 0.03 | 0.03 | 0.03 | 0.07 | 0.07 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.05 | 0.10 | 0.07 | 0.02 | 0.02 | 0.03 | 0.07 | 0.07 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.04 | 0.05 | 0.05 | 0.16 | 0.16 | 0.02 | 0.02 | 0.03 | 0.10 | 0.10 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.04 | 0.07 | 0.05 | 0.22 | 0.21 | 0.02 | 0.03 | 0.04 | 0.14 | 0.14 |
| N95 mask |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No. of shift/ day 1 | Number of staff per shift | 5 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
|  |  | 10 | 0.05 | 0.05 | 0.05 | 0.10 | 0.10 | 0.03 | 0.03 | 0.03 | 0.05 | 0.05 | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 |
|  |  | 20 | 0.03 | 0.05 | 0.05 | 0.07 | 0.07 | 0.01 | 0.01 | 0.01 | 0.04 | 0.04 | 0.01 | 0.01 | 0.01 | 0.03 | 0.03 |
|  |  | 30 | 0.03 | 0.05 | 0.03 | 0.08 | 0.12 | 0.01 | 0.01 | 0.03 | 0.05 | 0.05 | 0.01 | 0.01 | 0.01 | 0.03 | 0.03 |
| 2 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.03 | 0.03 | 0.03 | 0.05 | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.01 | 0.01 | 0.03 | 0.04 | 0.04 | 0.01 | 0.01 | 0.01 | 0.02 | 0.03 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.01 | 0.02 | 0.02 | 0.03 | 0.04 | 0.01 | 0.01 | 0.01 | 0.03 | 0.03 |
| 3 | Number of staff per shift | 5 | NA | NA | NA | NA | NA | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
|  |  | 10 | NA | NA | NA | NA | NA | 0.03 | 0.03 | 0.03 | 0.04 | 0.05 | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 |
|  |  | 20 | NA | NA | NA | NA | NA | 0.01 | 0.03 | 0.01 | 0.04 | 0.04 | 0.01 | 0.01 | 0.02 | 0.03 | 0.03 |
|  |  | 30 | NA | NA | NA | NA | NA | 0.02 | 0.02 | 0.02 | 0.05 | 0.05 | 0.01 | 0.01 | 0.01 | 0.03 | 0.03 |