**Appendix**

**Table S1**: Six simulation scenarios for studying power of testing treatment effect of intervention B using a constant correlation parameter. In the six scenarios, we vary number of clusters in each sequence (), different coefficients of variation for cluster sizes (), different ICCs (), different baseline event rates (baseline), different designs in Figure 2 (Design), and varying effect sizes (1-effect size), respectively.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scenario |  |  |  | baseline | Design (Figure 2) | 1- effect size |
| 1 | 12,18,36,60 | 0.4 | 0.2 | 0.2 | 1B | , |
| 2 | 18 | (0,1,0.1) | 0.2 | 0.2 | 1B |
| 3 | 18 | 0.4 | (0.01,0.1,0.02) | 0.2 | 1B |
| 4 | 18 | 0.4 | 0.2 | (0.1,0.5,0.1) | 1B |
| 5 | 24 | 0.4 | 0.2 | 0.2 | 2A-2F |
| 6 | 18 | 0.4 | 0.2 | 0.2 | 1B | , |

**Table S2**: Six simulation scenarios for studying power of testing treatment effect of intervention B using two correlation parameters in the common block exchangeable correlation structure ().

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scenario |  |  |  | baseline | Design (Figure 2) | 1- effect size |
| 1 | 12,18,36,60 | 0.4 | (0.03,0.015) | 0.2 | 1B | , |
| 2 | 18 | (0,1,0.1) | (0.03,0.015) | 0.2 | 1B |
| 3 | 18 | 0.4 | =0.03,0.06,0.1=(0.01,,0.01) | 0.2 | 1B |
| 4 | 18 | 0.4 | (0.03,0.015) | (0.1,0.5,0.1) | 1B |
| 5 | 24 | 0.4 | (0.03,0.015) | 0.2 | 2A-2F |
| 6 | 18 | 0.4 | (0.03,0.015) | 0.2 | 1B | , |

**Table S3:** 19 combinations of the two correlation parameters for simulations using the common block exchangeable correlation structure ().

|  |  |  |
| --- | --- | --- |
| Combination index of correlations |  |  |
| 1 | 0.03 | 0.01 |
| 2 | 0.02 |
| 3 | 0.03 |
| 4 | 0.06 | 0.01 |
| 5 | 0.02 |
| 6 | 0.03 |
| 7 | 0.04 |
| 8 | 0.05 |
| 9 | 0.06 |
| 10 | 0.1 | 0.01 |
| 11 | 0.02 |
| 12 | 0.03 |
| 13 | 0.04 |
| 14 | 0.05 |
| 15 | 0.06 |
| 16 | 0.07 |
| 17 | 0.08 |
| 18 | 0.09 |
| 19 | 0.1 |

Chart

Description automatically generated

**Figure S1 A-F**. The empirical type I error rate for testing the treatment effect of B in six different scenarios in Table 2 using the misspecified exchangeable working correlation structure. The gray band in each plot represents 95% confidence interval of the nominal type I error rate 0.05.

Chart, line chart

Description automatically generated

**Figure S2 A-F.** The statistical power for testing non-zero treatment effect of B in six different scenarios in Table S1 using the true working correlation structure. The empirical power of the eight tests is shown with the predicted power calculated from equation (5).