**Multiple imputation methods for bivariate outcomes in cluster randomised trials.**

**Supplementary File 1**

## Results for for $Y_1$

**Table A1:** Percentage bias for treatment effect on $Y_1$ for scenarios corresponding to missing mechanism associated with individual level covariate

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25\ n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | -1.3 | -0.6 | -0.7 | -0.8 |
| | | | 0.20, 0.05 | -1.3 | -0.6 | -0.6 | -0.8 |
| | | | 0.20, 0.20 | -1.3 | -0.6 | -0.6 | -0.8 |
| | | | 0.60, 0.01 | -1.2 | -0.5 | -0.4 | -0.6 |
| | | .30,.10 | 0.01, 0.01 | -1.4 | -0.4 | -0.9 | -0.7 |
| | | | 0.20, 0.05 | -1.4 | -0.2 | -0.8 | -0.6 |
| | | | 0.20, 0.20 | -1.4 | -0.2 | -0.8 | -0.6 |
| | | | 0.60, 0.01 | -1.3 | 0.3 | -0.7 | -0.5 |
| | High | .20,.20 | 0.01, 0.01 | -0.8 | -0.8 | -0.6 | -0.6 |
| | | | 0.20, 0.05 | -0.9 | -0.8 | -0.5 | -0.5 |
| | | | 0.20, 0.20 | -0.8 | -0.8 | -0.5 | -0.5 |
| | | | 0.60, 0.01 | -0.9 | -0.8 | -0.3 | -0.3 |
| | | .30,.10 | 0.01, 0.01 | -0.6 | -0.7 | -0.7 | -0.5 |
| | | | 0.20, 0.05 | -0.5 | -0.3 | -0.6 | -0.3 |
| | | | 0.20, 0.20 | -0.5 | -0.3 | -0.6 | -0.3 |
| | | | 0.60, 0.01 | -0.4 | 0.3 | -0.4 | -0.3 |
| $J = 5$ , $n_j = 50$ | Low | .20,.20 | 0.01, 0.01 | -0.6 | -0.5 | -0.3 | -0.5 |
| | | | 0.20, 0.05 | -2.4 | -2.1 | -2.0 | -2.2 |
| | | | 0.20, 0.20 | -2.4 | -2.1 | -2.0 | -2.2 |
| | | | 0.60, 0.01 | -5.6 | -5.1 | -5.1 | -5.4 |
| | | .30,.10 | 0.01, 0.01 | -1.1 | -0.7 | -1.0 | -0.9 |
| | | | 0.20, 0.05 | -2.9 | -2.4 | -2.8 | -2.5 |
| | | | 0.20, 0.20 | -2.9 | -2.4 | -2.8 | -2.5 |
| | | | 0.60, 0.01 | -0.9 | 0.7 | -0.3 | -0.1 |
| | High | .20,.20 | 0.01, 0.01 | -0.5 | -0.6 | -0.9 | -1.0 |
| | | | 0.20, 0.05 | -2.3 | -2.2 | -2.6 | -2.7 |
| | | | 0.20, 0.20 | -2.3 | -2.3 | -2.6 | -2.7 |
| | | | 0.60, 0.01 | -5.4 | -4.9 | -5.7 | -5.9 |
| | | .30,.10 | 0.01, 0.01 | -0.5 | -0.3 | 0.0 | -0.5 |
| | | | 0.20, 0.05 | -2.3 | -2.0 | -1.7 | -2.2 |
| | | | 0.20, 0.20 | -2.3 | -2.0 | -1.7 | -2.2 |
| | | | 0.60, 0.01 | -5.5 | -5.0 | -4.8 | -5.3 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | 0.6 | 0.3 | 0.4 | 0.3 |
| | | | 0.20, 0.05 | -0.2 | -0.6 | -0.5 | -0.5 |
| | | | 0.20, 0.20 | -0.2 | -0.6 | -0.5 | -0.5 |
| | | | 0.60, 0.01 | -1.8 | -2.2 | -2.2 | -2.1 |
| | | .30,.10 | 0.01, 0.01 | 0.8 | 0.2 | 0.2 | 0.3 |
| | | | 0.20, 0.05 | -0.1 | -0.7 | -0.7 | -0.6 |
| | | | 0.20, 0.20 | -0.1 | -0.8 | -0.7 | -0.7 |
| | | | 0.60, 0.01 | -1.9 | -2.4 | -2.4 | -2.4 |
| | High | .20,.20 | 0.01, 0.01 | 0.4 | -0.2 | -0.1 | -0.2 |
| | | | 0.20, 0.05 | -0.5 | -1.0 | -1.0 | -1.1 |
| | | | 0.20, 0.20 | -0.5 | -1.0 | -0.9 | -1.1 |
| | | | 0.60, 0.01 | -2.1 | -2.6 | -2.6 | -2.8 |
| | | .30,.10 | 0.01, 0.01 | 0.8 | 0.1 | 0.7 | 0.5 |
| | | | 0.20, 0.05 | 0.0 | -0.8 | -0.2 | -0.2 |
| | | | 0.20, 0.20 | -0.1 | -0.9 | -0.2 | -0.3 |
| | | | 0.60, 0.01 | -1.5 | -2.6 | -2.0 | -1.9 |

**Table A2:** Percentage bias for treatment effect on $Y_1$ for scenarios corresponding to missing mechanism associated with cluster-level covariate

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25$, $n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | -0.4 | -0.9 | -1.3 | -0.7 |
| | | | 0.20, 0.05 | -0.9 | -1.0 | -1.5 | -1.0 |
| | | | 0.20, 0.20 | -0.9 | -1.1 | -1.5 | -1.0 |
| | | | 0.60, 0.01 | -3.9 | -2.9 | -1.5 | -1.9 |
| | | .30,.10 | 0.01, 0.01 | -1.1 | -1.1 | -1.8 | -1.4 |
| | | | 0.20, 0.05 | -1.9 | -0.9 | -1.9 | -1.5 |
| | | | 0.20, 0.20 | -1.8 | -0.9 | -1.9 | -1.4 |
| | | | 0.60, 0.01 | -2.8 | -0.6 | -2.1 | -2.0 |
| | High | .20,.20 | 0.01, 0.01 | -0.5 | -0.6 | -0.9 | -0.3 |
| | | | 0.20, 0.05 | -0.8 | -0.5 | -0.7 | -0.3 |
| | | | 0.20, 0.20 | -0.7 | -0.5 | -1.0 | -0.2 |
| | | | 0.60, 0.01 | -1.2 | -0.4 | -0.6 | -0.9 |
| | | .30,.10 | 0.01, 0.01 | -0.2 | -0.3 | -0.4 | -0.3 |
| | | | 0.20, 0.05 | -0.4 | -0.2 | -0.1 | -0.3 |
| | | | 0.20, 0.20 | -0.4 | -0.2 | -0.3 | -0.3 |
| | | | 0.60, 0.01 | -0.4 | 0.1 | 0.5 | -0.9 |
| $J = 5$, $n_j = 50$ | Low | .20,.20 | 0.01, 0.01 | 0.0 | 0.1 | 0.1 | 0.1 |
| | | | 0.20, 0.05 | -1.3 | -0.9 | -1.1 | -0.8 |
| | | | 0.20, 0.20 | -1.3 | -0.9 | -1.1 | -0.8 |
| | | | 0.60, 0.01 | -3.5 | -2.9 | -3.4 | -2.6 |
| | | .30,.10 | 0.01, 0.01 | -0.8 | -0.3 | -0.6 | -0.3 |
| | | | 0.20, 0.05 | -2.2 | -1.2 | -1.8 | -1.2 |
| | | | 0.20, 0.20 | -2.1 | -1.2 | -1.8 | -1.1 |
| | | | 0.60, 0.01 | -4.4 | -2.7 | -4.1 | -3.1 |
| | High | .20,.20 | 0.01, 0.01 | 0.0 | -0.1 | 0.0 | 0.7 |
| | | | 0.20, 0.05 | -1.8 | -0.9 | -1.3 | -0.1 |
| | | | 0.20, 0.20 | -1.9 | -0.9 | -0.7 | 0.1 |
| | | | 0.60, 0.01 | -4.8 | -2.5 | -3.8 | -1.8 |
| | | .30,.10 | 0.01, 0.01 | -0.2 | 0.3 | -0.1 | 0.5 |
| | | | 0.20, 0.05 | -1.4 | -0.2 | 0.0 | 0.2 |
| | | | 0.20, 0.20 | -1.3 | -0.1 | -1.3 | 0.2 |
| | | | 0.60, 0.01 | -4.1 | -1.1 | -3.1 | -1.3 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | 0.6 | 0.3 | 0.6 | 0.6 |
| | | | 0.20, 0.05 | 0.1 | -0.3 | 0.2 | 0.2 |
| | | | 0.20, 0.20 | 0.1 | -0.3 | 0.2 | 0.2 |
| | | | 0.60, 0.01 | -0.9 | -1.6 | -0.7 | -0.8 |
| | | .30,.10 | 0.01, 0.01 | 0.2 | 0.6 | 0.7 | 0.5 |
| | | | 0.20, 0.05 | -0.3 | -0.2 | 0.3 | 0.1 |
| | | | 0.20, 0.20 | -0.3 | -0.2 | 0.2 | 0.0 |
| | | | 0.60, 0.01 | -1.2 | -1.7 | -0.8 | -1.0 |
| | High | .20,.20 | 0.01, 0.01 | -0.3 | 0.1 | 0.1 | 0.1 |
| | | | 0.20, 0.05 | -1.1 | -0.6 | -0.1 | -0.4 |
| | | | 0.20, 0.20 | -1.0 | -0.7 | 0.0 | -0.5 |
| | | | 0.60, 0.01 | -2.9 | -2.2 | -0.7 | -0.9 |
| | | .30,.10 | 0.01, 0.01 | -0.4 | -0.3 | 0.1 | -0.3 |
| | | | 0.20, 0.05 | -1.9 | -1.2 | -0.7 | -1.3 |
| | | | 0.20, 0.20 | -1.8 | -1.2 | -0.5 | -1.2 |
| | | | 0.60, 0.01 | -3.9 | -2.9 | -1.5 | -1.9 |

**Table A3:** Percentage bias for treatment effect on $Y_1$ for scenarios corresponding to missing mechanism dependent on individual and cluster-level covariates

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25$, $n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | -0.6 | -1.2 | -1.4 | -1.2 |
| | | | 0.20, 0.05 | -1.1 | -1.4 | -1.6 | -1.5 |
| | | | 0.20, 0.20 | -1.0 | -1.4 | -1.7 | -1.5 |
| | | | 0.60, 0.01 | -1.7 | -1.9 | -2.0 | -1.7 |
| | | .30,.10 | 0.01, 0.01 | -1.2 | -1.5 | -1.8 | -1.7 |
| | | | 0.20, 0.05 | -2.0 | -1.4 | -1.9 | -1.8 |
| | | | 0.20, 0.20 | -1.9 | -1.4 | -1.8 | -1.7 |
| | | | 0.60, 0.01 | -2.9 | -1.2 | -2.1 | -2.2 |
| | High | .20,.20 | 0.01, 0.01 | -0.4 | -1.2 | -1.8 | -1.2 |
| | | | 0.20, 0.05 | -1.1 | -1.1 | -1.9 | -1.5 |
| | | | 0.20, 0.20 | -1.2 | -1.1 | -2.0 | -1.5 |
| | | | 0.60, 0.01 | -2.4 | -0.9 | -2.2 | -2.4 |
| | | .30,.10 | 0.01, 0.01 | -0.6 | -1.1 | -0.4 | -0.8 |
| | | | 0.20, 0.05 | -1.0 | -0.9 | -0.5 | -0.9 |
| | | | 0.20, 0.20 | -1.0 | -0.9 | -0.3 | -0.8 |
| | | | 0.60, 0.01 | -1.3 | -0.6 | -0.5 | -1.4 |
| $J = 5$, $n_j = 50$ | Low | .20,.20 | 0.01, 0.01 | -0.2 | 0.1 | 0.2 | 0.1 |
| | | | 0.20, 0.05 | -1.7 | -1.0 | -1.0 | -0.8 |
| | | | 0.20, 0.20 | -1.7 | -1.0 | -1.0 | -0.7 |
| | | | 0.60, 0.01 | -3.8 | -3.1 | -3.3 | -2.6 |
| | | .30,.10 | 0.01, 0.01 | -1.0 | 0.1 | -0.3 | -0.3 |
| | | | 0.20, 0.05 | -2.7 | -0.8 | -1.6 | -1.3 |
| | | | 0.20, 0.20 | -2.7 | -0.8 | -1.5 | -1.2 |
| | | | 0.60, 0.01 | -4.8 | -2.4 | -3.8 | -3.2 |
| | High | .20,.20 | 0.01, 0.01 | -0.9 | 0.7 | -0.1 | 0.5 |
| | | | 0.20, 0.05 | -2.4 | 0.1 | -1.4 | -0.3 |
| | | | 0.20, 0.20 | -2.4 | 0.2 | -1.3 | -0.2 |
| | | | 0.60, 0.01 | -4.7 | -0.9 | -2.8 | -2.0 |
| | | .30,.10 | 0.01, 0.01 | -0.3 | -0.1 | -0.2 | 0.0 |
| | | | 0.20, 0.05 | -1.8 | -0.6 | -1.0 | -0.7 |
| | | | 0.20, 0.20 | -1.9 | -0.5 | -0.1 | -0.6 |
| | | | 0.60, 0.01 | -3.9 | -1.9 | -2.3 | -2.7 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | 0.8 | 0.4 | 0.6 | 0.7 |
| | | | 0.20, 0.05 | 0.2 | -0.2 | 0.1 | 0.3 |
| | | | 0.20, 0.20 | 0.1 | -0.2 | 0.1 | 0.3 |
| | | | 0.60, 0.01 | -1.0 | -1.4 | -0.9 | -0.8 |
| | | .30,.10 | 0.01, 0.01 | 0.1 | 0.6 | 0.5 | 0.2 |
| | | | 0.20, 0.05 | -0.5 | -0.1 | -0.1 | -0.2 |
| | | | 0.20, 0.20 | -0.6 | -0.1 | -0.1 | -0.3 |
| | | | 0.60, 0.01 | -1.6 | -1.4 | -1.3 | -1.6 |
| | High | .20,.20 | 0.01, 0.01 | 0.6 | 0.5 | 0.6 | 0.5 |
| | | | 0.20, 0.05 | -0.2 | 0.0 | 0.1 | 0.0 |
| | | | 0.20, 0.20 | -0.2 | 0.0 | 0.0 | 0.0 |
| | | | 0.60, 0.01 | -1.6 | -1.4 | -1.3 | -1.6 |
| | | .30,.10 | 0.01, 0.01 | 0.6 | 0.9 | 1.2 | 1.1 |
| | | | 0.20, 0.05 | -0.2 | 0.0 | 0.5 | 0.6 |
| | | | 0.20, 0.20 | -0.1 | 0.0 | 0.3 | 0.6 |
| | | | 0.60, 0.01 | -1.3 | -1.6 | -0.6 | -0.1 |

**Table A4:** Coverage rate and average width (AW) of the 95% CI for treatment effect on $Y_1$ after each of the MI strategies, when the missing mechanism depends only on individual level covariate

| Design | $\eta$ | Prob. Miss | ICC | CCA | | SMI | | FMI | | MMI | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | CR | AW | CR | AW | CR | AW | CR | AW |
| $J = 25$, | Low | .20,.20 | 0.01, 0.01 | 95.1 | 18.4 | 94.5 | 16.7 | 97.8 | 19.7 | 95.3 | 16.9 |
| $n_j = 10$ | | | 0.20, 0.05 | 94.2 | 28.1 | 91.8 | 24.0 | 96.5 | 29.2 | 94.4 | 26.8 |
| | | | 0.20, 0.20 | 93.9 | 28.2 | 91.6 | 24.0 | 96.6 | 29.2 | 93.7 | 26.4 |
| | | | 0.60, 0.01 | 94.3 | 56.5 | 87.8 | 46.4 | 95.1 | 57.2 | 94.3 | 56.0 |
| | | .30,.10 | 0.01, 0.01 | 95.3 | 18.5 | 95.6 | 17.9 | 98.2 | 22.6 | 95.0 | 18.1 |
| | | | 0.20, 0.05 | 93.5 | 28.3 | 89.5 | 23.9 | 96.6 | 31.3 | 93.8 | 27.3 |
| | | | 0.20, 0.20 | 93.8 | 28.3 | 89.8 | 23.8 | 96.5 | 31.3 | 92.7 | 26.6 |
| | | | 0.60, 0.01 | 95.2 | 56.7 | 85.3 | 44.0 | 95.2 | 58.2 | 95.0 | 56.4 |
| | High | .20,.20 | 0.01, 0.01 | 94.4 | 18.5 | 94.0 | 18.3 | 97.7 | 22.6 | 94.6 | 18.2 |
| | | | 0.20, 0.05 | 93.8 | 28.3 | 89.9 | 24.7 | 96.8 | 31.3 | 93.7 | 27.6 |
| | | | 0.20, 0.20 | 93.8 | 28.3 | 89.8 | 24.7 | 96.8 | 31.3 | 93.1 | 27.1 |
| | | | 0.60, 0.01 | 94.2 | 56.7 | 87.4 | 45.7 | 95.2 | 58.3 | 94.0 | 56.5 |
| | | .30,.10 | 0.01, 0.01 | 94.6 | 18.6 | 96.3 | 20.3 | 97.8 | 25.5 | 95.0 | 19.8 |
| | | | 0.20, 0.05 | 93.4 | 28.4 | 91.7 | 25.8 | 96.8 | 33.4 | 93.2 | 28.4 |
| | | | 0.20, 0.20 | 93.6 | 28.4 | 91.7 | 25.7 | 97.0 | 33.4 | 92.6 | 27.8 |
| | | | 0.60, 0.01 | 94.2 | 56.8 | 86.2 | 45.3 | 95.4 | 59.5 | 94.3 | 57.1 |
| $J = 5$, | Low | .20,.20 | 0.01, 0.01 | 93.9 | 20.3 | 93.0 | 18.1 | 96.0 | 20.9 | 92.8 | 18.5 |
| $n_j = 50$ | | | 0.20, 0.05 | 89.7 | 50.9 | 83.2 | 40.4 | 91.1 | 52.0 | 89.6 | 50.1 |
| | | | 0.20, 0.20 | 89.6 | 50.7 | 83.3 | 40.8 | 91.5 | 52.3 | 90.0 | 50.0 |
| | | | 0.60, 0.01 | 90.8 | 118.7 | 81.9 | 91.9 | 90.6 | 120.1 | 90.2 | 118.8 |
| | | .30,.10 | 0.01, 0.01 | 94.4 | 20.4 | 92.8 | 19.2 | 96.5 | 23.0 | 92.9 | 19.3 |
| | | | 0.20, 0.05 | 89.8 | 51.1 | 78.6 | 37.4 | 92.3 | 53.0 | 89.3 | 49.8 |
| | | | 0.20, 0.20 | 90.4 | 50.8 | 79.1 | 37.8 | 92.5 | 53.2 | 89.7 | 49.7 |
| | | | 0.60, 0.01 | 92.1 | 120.2 | 79.6 | 82.9 | 92.9 | 121.0 | 92.2 | 119.7 |
| | High | .20,.20 | 0.01, 0.01 | 93.3 | 20.4 | 92.4 | 19.4 | 96.2 | 23.0 | 93.2 | 20.1 |
| | | | 0.20, 0.05 | 90.1 | 51.4 | 80.8 | 38.7 | 92.3 | 53.0 | 89.7 | 50.4 |
| | | | 0.20, 0.20 | 90.2 | 51.3 | 81.3 | 39.0 | 92.1 | 53.1 | 89.5 | 50.2 |
| | | | 0.60, 0.01 | 90.4 | 119.4 | 79.0 | 85.9 | 91.1 | 120.7 | 90.4 | 119.0 |
| | | .30,.10 | 0.01, 0.01 | 94.1 | 20.4 | 93.3 | 21.2 | 96.7 | 25.2 | 93.0 | 21.6 |
| | | | 0.20, 0.05 | 89.8 | 51.0 | 78.3 | 37.1 | 93.0 | 54.0 | 89.7 | 50.4 |
| | | | 0.20, 0.20 | 89.5 | 51.1 | 78.7 | 37.5 | 93.1 | 54.2 | 89.5 | 50.1 |
| | | | 0.60, 0.01 | 89.9 | 118.9 | 75.0 | 79.2 | 91.7 | 120.8 | 91.8 | 119.2 |
| $J = 15$, | Low | .20,.20 | 0.01, 0.01 | 94.5 | 17.5 | 93.4 | 15.8 | 97.2 | 18.9 | 93.2 | 16.0 |
| unbalanced | | | 0.20, 0.05 | 93.6 | 33.2 | 88.3 | 27.5 | 95.7 | 34.5 | 92.9 | 32.2 |
| | | | 0.20, 0.20 | 93.6 | 33.2 | 88.3 | 27.5 | 95.7 | 34.5 | 92.9 | 32.2 |
| | | | 0.60, 0.01 | 93.9 | 71.6 | 85.8 | 57.3 | 94.7 | 72.4 | 94.5 | 71.2 |
| | | .30,.10 | 0.01, 0.01 | 93.2 | 17.7 | 93.9 | 17.1 | 97.4 | 21.7 | 92.9 | 17.0 |
| | | | 0.20, 0.05 | 92.8 | 33.4 | 85.4 | 26.6 | 96.3 | 36.2 | 92.3 | 32.4 |
| | | | 0.20, 0.20 | 93.5 | 33.4 | 85.3 | 26.6 | 96.4 | 36.1 | 91.9 | 32.1 |
| | | | 0.60, 0.01 | 93.6 | 71.5 | 82.5 | 53.1 | 94.9 | 73.2 | 94.1 | 71.5 |
| | High | .20,.20 | 0.01, 0.01 | 93.4 | 17.7 | 92.8 | 17.4 | 97.2 | 21.3 | 93.4 | 17.5 |
| | | | 0.20, 0.05 | 92.6 | 33.4 | 86.0 | 27.4 | 95.7 | 35.9 | 93.4 | 32.9 |
| | | | 0.20, 0.20 | 93.0 | 33.4 | 86.1 | 27.4 | 95.7 | 35.9 | 93.4 | 32.6 |
| | | | 0.60, 0.01 | 93.9 | 71.7 | 83.4 | 55.1 | 94.8 | 73.2 | 93.8 | 71.6 |
| | | .30,.10 | 0.01, 0.01 | 93.9 | 17.8 | 93.7 | 19.0 | 98.0 | 24.4 | 93.7 | 18.9 |
| | | | 0.20, 0.05 | 93.8 | 33.5 | 84.8 | 27.4 | 97.0 | 37.9 | 93.7 | 33.5 |
| | | | 0.20, 0.20 | 94.0 | 33.5 | 84.4 | 27.3 | 96.8 | 37.8 | 93.6 | 33.1 |
| | | | 0.60, 0.01 | 94.3 | 71.6 | 80.3 | 52.5 | 94.3 | 74.1 | 93.9 | 72.0 |

**Table A5:** Coverage rate and average width (AW) of the 95 CI for treatment effect on $Y_1$ after each of the MI strategies, when the missing mechanism depends only on cluster level covariate

| Design | $\eta$ | Prob. Miss | ICC | CCA | | SMI | | FMI | | MMI | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | CR | AW | CR | AW | CR | AW | CR | AW |
| $J = 25$ | Low | .20,.20 | 0.01, 0.01 | 93.9 | 19.3 | 95.4 | 18.0 | 98.0 | 23.5 | 95.5 | 18.0 |
| $n_j = 10$ | | | 0.20, 0.05 | 94.8 | 29.0 | 91.7 | 25.9 | 97.0 | 32.2 | 93.4 | 27.4 |
| | | | 0.20, 0.20 | 94.9 | 29.1 | 91.7 | 25.9 | 97.1 | 32.2 | 93.2 | 27.2 |
| | | | 0.60, 0.01 | 92.9 | 73.8 | 85.6 | 63.1 | 93.7 | 79.2 | 93.7 | 75.9 |
| | | .30,.10 | 0.01, 0.01 | 94.9 | 19.4 | 94.6 | 19.6 | 99.1 | 27.8 | 94.6 | 19.5 |
| | | | 0.20, 0.05 | 95.3 | 29.2 | 91.9 | 26.5 | 97.6 | 35.6 | 92.8 | 28.1 |
| | | | 0.20, 0.20 | 95.2 | 29.1 | 92.2 | 26.6 | 97.8 | 35.5 | 92.6 | 27.9 |
| | | | 0.60, 0.01 | 94.4 | 57.7 | 89.4 | 49.4 | 95.4 | 61.1 | 94.2 | 57.7 |
| | High | .20,.20 | 0.01, 0.01 | 93.9 | 19.8 | 95.1 | 20.2 | 99.3 | 29.6 | 95.7 | 20.2 |
| | | | 0.20, 0.05 | 93.6 | 29.9 | 92.5 | 27.6 | 97.6 | 36.7 | 94.3 | 29.2 |
| | | | 0.20, 0.20 | 92.8 | 29.8 | 92.5 | 27.6 | 97.8 | 37.0 | 93.9 | 29.0 |
| | | | 0.60, 0.01 | 94.6 | 59.2 | 89.0 | 51.6 | 96.4 | 61.5 | 94.8 | 59.2 |
| | | .30,.10 | 0.01, 0.01 | 95.3 | 19.9 | 95.2 | 22.4 | 99.1 | 33.9 | 94.4 | 21.8 |
| | | | 0.20, 0.05 | 93.5 | 29.9 | 91.3 | 29.1 | 98.3 | 40.3 | 93.3 | 30.4 |
| | | | 0.20, 0.20 | 93.9 | 30.0 | 91.4 | 29.1 | 98.4 | 40.7 | 93.3 | 30.4 |
| | | | 0.60, 0.01 | 94.9 | 59.2 | 88.5 | 52.0 | 95.6 | 63.8 | 95.1 | 60.5 |
| $J = 5$ | Low | .20,.20 | 0.01, 0.01 | 94.4 | 21.2 | 95.3 | 20.5 | 97.5 | 23.6 | 96.2 | 20.8 |
| $n_j = 50$ | | | 0.20, 0.05 | 91.1 | 51.6 | 89.2 | 46.4 | 92.9 | 53.7 | 91.7 | 51.0 |
| | | | 0.20, 0.20 | 90.8 | 51.7 | 89.0 | 46.4 | 92.8 | 53.6 | 91.5 | 51.1 |
| | | | 0.60, 0.01 | 91.0 | 119.2 | 86.7 | 105.7 | 91.5 | 122.1 | 91.1 | 120.2 |
| | | .30,.10 | 0.01, 0.01 | 92.9 | 21.3 | 95.3 | 22.4 | 98.1 | 26.9 | 95.8 | 22.5 |
| | | | 0.20, 0.05 | 90.1 | 51.7 | 87.8 | 45.9 | 93.9 | 55.4 | 91.1 | 51.1 |
| | | | 0.20, 0.20 | 89.9 | 51.7 | 87.6 | 46.0 | 93.6 | 55.4 | 91.5 | 51.2 |
| | | | 0.60, 0.01 | 91.2 | 119.3 | 85.1 | 101.8 | 91.6 | 122.3 | 90.8 | 120.4 |
| | High | .20,.20 | 0.01, 0.01 | 94.4 | 21.9 | 96.3 | 24.1 | 98.9 | 32.3 | 96.6 | 29.1 |
| | | | 0.20, 0.05 | 89.7 | 52.0 | 87.7 | 48.4 | 94.1 | 60.0 | 90.7 | 58.5 |
| | | | 0.20, 0.20 | 89.1 | 52.3 | 88.1 | 48.5 | 93.8 | 61.9 | 91.6 | 58.6 |
| | | | 0.60, 0.01 | 89.9 | 120.1 | 85.0 | 107.6 | 91.8 | 128.2 | 91.9 | 128.7 |
| | | .30,.10 | 0.01, 0.01 | 93.9 | 21.9 | 96.8 | 27.1 | 98.4 | 38.7 | 96.7 | 29.9 |
| | | | 0.20, 0.05 | 89.7 | 52.3 | 88.8 | 49.6 | 95.3 | 65.4 | 91.3 | 57.5 |
| | | | 0.20, 0.20 | 89.9 | 52.3 | 89.2 | 49.5 | 95.3 | 65.5 | 91.8 | 57.7 |
| | | | 0.60, 0.01 | 89.8 | 119.8 | 84.1 | 106.2 | 92.3 | 129.4 | 91.1 | 127.6 |
| $J = 15$ | Low | .20,.20 | 0.01, 0.01 | 93.6 | 18.3 | 95.1 | 17.4 | 97.9 | 22.4 | 95.2 | 17.4 |
| unbalanced | | | 0.20, 0.05 | 91.9 | 34.0 | 89.0 | 30.0 | 95.5 | 37.0 | 92.6 | 32.8 |
| | | | 0.20, 0.20 | 91.9 | 34.1 | 88.8 | 30.0 | 95.4 | 36.9 | 92.1 | 32.5 |
| | | | 0.60, 0.01 | 92.6 | 72.7 | 87.5 | 62.8 | 94.4 | 74.8 | 93.8 | 72.6 |
| | | .30,.10 | 0.01, 0.01 | 95.3 | 18.3 | 95.9 | 18.8 | 99.0 | 26.5 | 95.4 | 18.7 |
| | | | 0.20, 0.05 | 93.6 | 34.0 | 88.7 | 30.0 | 96.7 | 39.6 | 92.4 | 33.2 |
| | | | 0.20, 0.20 | 93.1 | 34.0 | 88.8 | 30.1 | 96.7 | 39.6 | 92.1 | 32.8 |
| | | | 0.60, 0.01 | 93.5 | 72.6 | 85.6 | 60.7 | 94.9 | 76.0 | 93.7 | 73.0 |
| | High | .20,.20 | 0.01, 0.01 | 93.7 | 18.9 | 94.6 | 19.4 | 99.1 | 29.9 | 94.5 | 19.5 |
| | | | 0.20, 0.05 | 91.6 | 34.8 | 88.1 | 31.3 | 96.2 | 42.2 | 92.2 | 34.4 |
| | | | 0.20, 0.20 | 91.2 | 34.8 | 87.8 | 31.3 | 96.2 | 42.2 | 92.3 | 34.0 |
| | | | 0.60, 0.01 | 92.6 | 73.9 | 86.5 | 63.6 | 94.4 | 77.0 | 93.6 | 74.4 |
| | | .30,.10 | 0.01, 0.01 | 93.7 | 18.9 | 95.9 | 21.8 | 99.6 | 35.3 | 94.8 | 21.6 |
| | | | 0.20, 0.05 | 91.9 | 34.8 | 87.8 | 32.4 | 96.9 | 45.3 | 92.0 | 35.6 |
| | | | 0.20, 0.20 | 91.4 | 34.8 | 88.2 | 32.4 | 97.1 | 45.9 | 91.9 | 35.3 |
| | | | 0.60, 0.01 | 92.9 | 73.8 | 85.6 | 63.1 | 93.7 | 79.2 | 93.7 | 75.9 |

**Table A6:** Coverage rate and average width (AW) of the 95 CI for treatment effect on $Y_1$ after each of the MI strategies, when the missing mechanism depends individual and cluster-level covariates

| Design | $\eta$ | Prob. Miss | ICC | CCA | | SMI | | FMI | | MMI | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | CR | AW | CR | AW | CR | AW | CR | AW |
| $J = 25$, | Low | .20,.20 | 0.01, 0.01 | 95.2 | 18.8 | 95.1 | 17.7 | 98.7 | 22.1 | 95.2 | 17.6 |
| $n_j = 50$ | | | 0.20, 0.05 | 94.1 | 27.5 | 91.5 | 25.7 | 96.9 | 31.1 | 93.5 | 27.5 |
| | | | 0.20, 0.20 | 94.0 | 27.6 | 91.3 | 25.8 | 96.7 | 31.1 | 93.1 | 27.2 |
| | | | 0.60, 0.01 | 94.6 | 55.8 | 90.1 | 50.3 | 95.4 | 58.7 | 94.5 | 57.0 |
| | | .30,.10 | 0.01, 0.01 | 95.1 | 18.9 | 96.1 | 19.5 | 99.1 | 25.9 | 95.8 | 19.0 |
| | | | 0.20, 0.05 | 94.3 | 27.7 | 90.9 | 26.6 | 97.8 | 33.8 | 93.3 | 28.2 |
| | | | 0.20, 0.20 | 94.9 | 27.7 | 90.8 | 26.7 | 97.9 | 33.9 | 92.8 | 27.8 |
| | | | 0.60, 0.01 | 94.3 | 55.9 | 89.6 | 49.8 | 95.8 | 60.1 | 94.4 | 57.5 |
| | High | .20,.20 | 0.01, 0.01 | 95.1 | 19.3 | 96.5 | 20.7 | 98.8 | 27.8 | 95.7 | 20.6 |
| | | | 0.20, 0.05 | 94.2 | 27.5 | 93.2 | 28.0 | 98.1 | 35.4 | 94.3 | 29.7 |
| | | | 0.20, 0.20 | 93.7 | 27.5 | 93.0 | 28.0 | 98.1 | 35.3 | 94.2 | 29.5 |
| | | | 0.60, 0.01 | 94.8 | 55.3 | 90.2 | 51.7 | 96.3 | 61.0 | 94.8 | 58.7 |
| | | .30,.10 | 0.01, 0.01 | 94.8 | 19.3 | 96.3 | 22.8 | 99.0 | 31.6 | 95.4 | 22.3 |
| | | | 0.20, 0.05 | 93.7 | 27.5 | 92.9 | 29.5 | 98.6 | 38.2 | 94.9 | 30.9 |
| | | | 0.20, 0.20 | 94.0 | 27.4 | 92.9 | 29.6 | 98.5 | 38.4 | 94.2 | 30.6 |
| | | | 0.60, 0.01 | 94.9 | 55.4 | 88.2 | 52.5 | 95.7 | 62.3 | 94.8 | 59.7 |
| $J = 5$ | Low | .20,.20 | 0.01, 0.01 | 94.3 | 20.5 | 95.4 | 20.2 | 97.0 | 22.4 | 95.1 | 20.3 |
| $n_j = 50$ | | | 0.20, 0.05 | 89.7 | 47.5 | 88.0 | 46.3 | 92.3 | 52.9 | 90.4 | 51.2 |
| | | | 0.20, 0.20 | 89.5 | 47.8 | 87.6 | 46.3 | 92.0 | 52.8 | 90.4 | 51.1 |
| | | | 0.60, 0.01 | 90.4 | 115.3 | 86.6 | 105.5 | 91.1 | 121.2 | 90.7 | 120.3 |
| | | .30,.10 | 0.01, 0.01 | 94.2 | 20.5 | 95.5 | 21.9 | 97.7 | 25.5 | 95.7 | 21.8 |
| | | | 0.20, 0.05 | 89.7 | 47.8 | 86.7 | 45.7 | 92.4 | 54.5 | 90.6 | 51.3 |
| | | | 0.20, 0.20 | 89.3 | 48.0 | 87.1 | 45.8 | 92.5 | 54.4 | 90.7 | 51.3 |
| | | | 0.60, 0.01 | 90.4 | 115.4 | 84.9 | 101.8 | 91.2 | 121.7 | 90.7 | 120.3 |
| | High | .20,.20 | 0.01, 0.01 | 92.9 | 22.6 | 96.1 | 23.7 | 98.0 | 29.8 | 95.8 | 23.8 |
| | | | 0.20, 0.05 | 88.2 | 46.4 | 86.7 | 47.4 | 92.9 | 57.4 | 90.4 | 52.9 |
| | | | 0.20, 0.20 | 89.1 | 46.3 | 86.9 | 47.4 | 93.4 | 57.5 | 90.9 | 52.9 |
| | | | 0.60, 0.01 | 90.6 | 112.8 | 85.1 | 104.7 | 91.6 | 126.3 | 90.9 | 122.2 |
| | | .30,.10 | 0.01, 0.01 | 91.7 | 22.7 | 97.0 | 26.4 | 98.8 | 33.7 | 97.4 | 26.3 |
| | | | 0.20, 0.05 | 89.3 | 46.6 | 87.6 | 48.1 | 93.6 | 59.1 | 91.0 | 53.8 |
| | | | 0.20, 0.20 | 89.3 | 46.5 | 87.4 | 48.1 | 93.7 | 62.2 | 90.8 | 53.7 |
| | | | 0.60, 0.01 | 90.7 | 112.4 | 83.5 | 103.2 | 91.9 | 126.5 | 91.6 | 122.7 |
| $J = 15$, | Low | .20,.20 | 0.01, 0.01 | 93.6 | 17.9 | 95.6 | 17.0 | 98.1 | 21.0 | 94.8 | 16.9 |
| unbalanced | | | 0.20, 0.05 | 93.0 | 31.9 | 89.8 | 29.9 | 95.4 | 36.1 | 92.5 | 32.9 |
| | | | 0.20, 0.20 | 92.8 | 32.0 | 89.9 | 29.9 | 95.4 | 36.0 | 92.1 | 32.6 |
| | | | 0.60, 0.01 | 92.9 | 70.2 | 87.9 | 62.7 | 94.3 | 74.0 | 93.9 | 72.4 |
| | | .30,.10 | 0.01, 0.01 | 93.9 | 17.9 | 95.4 | 18.4 | 98.6 | 24.7 | 94.6 | 18.2 |
| | | | 0.20, 0.05 | 93.3 | 31.9 | 88.7 | 29.9 | 96.1 | 38.4 | 92.5 | 33.3 |
| | | | 0.20, 0.20 | 92.8 | 31.9 | 88.3 | 29.9 | 96.1 | 38.3 | 92.1 | 32.9 |
| | | | 0.60, 0.01 | 94.2 | 70.1 | 86.1 | 60.8 | 94.4 | 75.0 | 93.3 | 72.7 |
| | High | .20,.20 | 0.01, 0.01 | 94.9 | 18.8 | 95.1 | 19.5 | 98.7 | 27.3 | 94.9 | 19.7 |
| | | | 0.20, 0.05 | 92.3 | 31.6 | 89.3 | 31.0 | 96.8 | 40.1 | 94.3 | 34.6 |
| | | | 0.20, 0.20 | 92.8 | 31.6 | 89.0 | 31.0 | 96.8 | 40.2 | 93.9 | 34.3 |
| | | | 0.60, 0.01 | 94.2 | 70.1 | 86.1 | 60.8 | 94.4 | 75.0 | 93.3 | 72.7 |
| | | .30,.10 | 0.01, 0.01 | 93.7 | 18.8 | 94.2 | 21.4 | 99.0 | 31.1 | 94.8 | 21.4 |
| | | | 0.20, 0.05 | 92.6 | 31.6 | 87.9 | 31.9 | 96.8 | 42.7 | 92.8 | 35.6 |
| | | | 0.20, 0.20 | 92.3 | 31.6 | 88.1 | 31.9 | 96.8 | 43.1 | 92.3 | 35.1 |
| | | | 0.60, 0.01 | 93.4 | 69.2 | 84.3 | 62.1 | 94.2 | 77.5 | 94.0 | 74.7 |

**Table A7:** RMSE for treatment estimate on $Y_1$ after each of the MI methods under comparison, for scenarios corresponding to missing data mechanisms associated with individual covariate

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25$, $n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | 4.67 | 4.20 | 4.24 | 4.20 |
| | | | 0.20, 0.05 | 7.20 | 6.93 | 6.86 | 6.88 |
| | | | 0.20, 0.20 | 7.20 | 6.93 | 6.87 | 6.89 |
| | | | 0.60, 0.01 | 14.41 | 14.48 | 14.21 | 14.25 |
| | | .30,.10 | 0.01, 0.01 | 4.62 | 4.38 | 4.53 | 4.35 |
| | | | 0.20, 0.05 | 7.20 | 7.11 | 7.07 | 7.04 |
| | | | 0.20, 0.20 | 7.20 | 7.11 | 7.07 | 7.06 |
| | | | 0.60, 0.01 | 14.44 | 14.72 | 14.34 | 14.35 |
| | High | .20,.20 | 0.01, 0.01 | 4.77 | 4.59 | 4.69 | 4.67 |
| | | | 0.20, 0.05 | 7.31 | 7.31 | 7.15 | 7.25 |
| | | | 0.20, 0.20 | 7.32 | 7.31 | 7.15 | 7.28 |
| | | | 0.60, 0.01 | 14.50 | 15.02 | 14.35 | 14.42 |
| | | .30,.10 | 0.01, 0.01 | 4.76 | 4.90 | 5.18 | 4.99 |
| | | | 0.20, 0.05 | 7.35 | 7.61 | 7.48 | 7.52 |
| | | | 0.20, 0.20 | 7.35 | 7.62 | 7.48 | 7.53 |
| | | | 0.60, 0.01 | 14.56 | 15.38 | 14.52 | 14.55 |
| $J = 5$, $n_j = 50$ | Low | .20,.20 | 0.01, 0.01 | 5.29 | 4.98 | 4.96 | 5.03 |
| | | | 0.20, 0.05 | 13.46 | 13.46 | 13.40 | 13.41 |
| | | | 0.20, 0.20 | 13.46 | 13.46 | 13.40 | 13.42 |
| | | | 0.60, 0.01 | 31.40 | 31.57 | 31.44 | 31.44 |
| | | .30,.10 | 0.01, 0.01 | 5.24 | 5.20 | 5.20 | 5.20 |
| | | | 0.20, 0.05 | 13.47 | 13.58 | 13.46 | 13.46 |
| | | | 0.20, 0.20 | 13.48 | 13.57 | 13.46 | 13.46 |
| | | | 0.60, 0.01 | 31.60 | 31.80 | 31.57 | 31.57 |
| | High | .20,.20 | 0.01, 0.01 | 5.33 | 5.26 | 5.32 | 5.28 |
| | | | 0.20, 0.05 | 13.51 | 13.58 | 13.55 | 13.56 |
| | | | 0.20, 0.20 | 13.51 | 13.58 | 13.55 | 13.56 |
| | | | 0.60, 0.01 | 31.46 | 31.65 | 31.52 | 31.53 |
| | | .30,.10 | 0.01, 0.01 | 5.39 | 5.69 | 5.71 | 5.69 |
| | | | 0.20, 0.05 | 13.60 | 13.75 | 13.65 | 13.66 |
| | | | 0.20, 0.20 | 13.60 | 13.76 | 13.65 | 13.66 |
| | | | 0.60, 0.01 | 31.53 | 31.78 | 31.51 | 31.52 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | 4.55 | 4.27 | 4.29 | 4.25 |
| | | | 0.20, 0.05 | 8.89 | 8.74 | 8.62 | 8.64 |
| | | | 0.20, 0.20 | 8.89 | 8.74 | 8.62 | 8.64 |
| | | | 0.60, 0.01 | 19.00 | 19.09 | 18.77 | 18.79 |
| | | .30,.10 | 0.01, 0.01 | 4.77 | 4.56 | 4.60 | 4.55 |
| | | | 0.20, 0.05 | 9.09 | 9.05 | 8.87 | 8.87 |
| | | | 0.20, 0.20 | 9.09 | 9.05 | 8.86 | 8.88 |
| | | | 0.60, 0.01 | 19.16 | 19.48 | 18.97 | 18.99 |
| | High | .20,.20 | 0.01, 0.01 | 4.60 | 4.64 | 4.67 | 4.64 |
| | | | 0.20, 0.05 | 8.90 | 9.14 | 8.84 | 8.92 |
| | | | 0.20, 0.20 | 8.90 | 9.14 | 8.83 | 8.92 |
| | | | 0.60, 0.01 | 18.98 | 19.65 | 18.91 | 18.98 |
| | | .30,.10 | 0.01, 0.01 | 4.68 | 4.95 | 5.03 | 5.01 |
| | | | 0.20, 0.05 | 8.94 | 9.35 | 9.00 | 9.02 |
| | | | 0.20, 0.20 | 8.95 | 9.36 | 9.00 | 9.04 |
| | | | 0.60, 0.01 | 18.97 | 19.92 | 18.96 | 18.91 |

**Table A8:** RMSE for treatment estimate on $Y_1$ after each of the MI methods under comparison, for scenarios corresponding to missing data mechanisms associated with cluster-level covariate

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25, n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | 4.92 | 4.42 | 4.57 | 4.44 |
| | | | 0.20, 0.05 | 7.47 | 7.16 | 7.22 | 7.25 |
| | | | 0.20, 0.20 | 7.47 | 7.16 | 7.22 | 7.25 |
| | | | 0.60, 0.01 | 19.61 | 21.34 | 20.46 | 20.12 |
| | | .30,.10 | 0.01, 0.01 | 4.88 | 4.78 | 5.19 | 4.83 |
| | | | 0.20, 0.05 | 7.43 | 7.42 | 7.64 | 7.45 |
| | | | 0.20, 0.20 | 7.41 | 7.43 | 7.64 | 7.45 |
| | | | 0.60, 0.01 | 14.64 | 15.06 | 14.82 | 14.80 |
| | High | .20,.20 | 0.01, 0.01 | 5.09 | 5.00 | 5.44 | 4.99 |
| | | | 0.20, 0.05 | 7.81 | 7.76 | 7.68 | 7.64 |
| | | | 0.20, 0.20 | 7.81 | 7.75 | 7.69 | 7.64 |
| | | | 0.60, 0.01 | 15.24 | 15.71 | 14.76 | 14.88 |
| | | .30,.10 | 0.01, 0.01 | 5.01 | 5.30 | 5.92 | 5.31 |
| | | | 0.20, 0.05 | 7.71 | 8.16 | 8.33 | 7.98 |
| | | | 0.20, 0.20 | 7.72 | 8.16 | 8.33 | 7.99 |
| | | | 0.60, 0.01 | 15.19 | 16.35 | 15.62 | 15.24 |
| $J = 5, n_j = 50$ | Low | .20,.20 | 0.01, 0.01 | 5.41 | 5.14 | 5.21 | 5.06 |
| | | | 0.20, 0.05 | 13.34 | 13.42 | 13.34 | 13.24 |
| | | | 0.20, 0.20 | 13.36 | 13.42 | 13.34 | 13.23 |
| | | | 0.60, 0.01 | 31.16 | 31.53 | 31.26 | 31.16 |
| | | .30,.10 | 0.01, 0.01 | 5.54 | 5.51 | 5.51 | 5.51 |
| | | | 0.20, 0.05 | 13.43 | 13.62 | 13.43 | 13.44 |
| | | | 0.20, 0.20 | 13.44 | 13.60 | 13.42 | 13.46 |
| | | | 0.60, 0.01 | 31.23 | 31.75 | 31.27 | 31.27 |
| | High | .20,.20 | 0.01, 0.01 | 5.55 | 5.65 | 5.99 | 7.41 |
| | | | 0.20, 0.05 | 13.64 | 14.17 | 13.82 | 14.83 |
| | | | 0.20, 0.20 | 13.64 | 14.14 | 14.39 | 14.82 |
| | | | 0.60, 0.01 | 31.22 | 33.05 | 31.79 | 32.49 |
| | | .30,.10 | 0.01, 0.01 | 5.68 | 6.30 | 6.85 | 6.43 |
| | | | 0.20, 0.05 | 13.82 | 14.50 | 14.88 | 14.29 |
| | | | 0.20, 0.20 | 13.83 | 14.47 | 14.36 | 14.28 |
| | | | 0.60, 0.01 | 31.42 | 33.49 | 31.95 | 32.19 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | 4.79 | 4.44 | 4.59 | 4.39 |
| | | | 0.20, 0.05 | 9.12 | 9.04 | 9.00 | 8.87 |
| | | | 0.20, 0.20 | 9.12 | 9.03 | 9.00 | 8.88 |
| | | | 0.60, 0.01 | 19.35 | 19.64 | 19.30 | 19.15 |
| | | .30,.10 | 0.01, 0.01 | 4.69 | 4.65 | 5.10 | 4.70 |
| | | | 0.20, 0.05 | 9.04 | 9.21 | 9.28 | 9.16 |
| | | | 0.20, 0.20 | 9.05 | 9.20 | 9.28 | 9.16 |
| | | | 0.60, 0.01 | 19.28 | 19.86 | 19.46 | 19.47 |
| | High | .20,.20 | 0.01, 0.01 | 4.89 | 4.91 | 5.55 | 4.99 |
| | | | 0.20, 0.05 | 9.49 | 9.73 | 9.74 | 9.57 |
| | | | 0.20, 0.20 | 9.50 | 9.72 | 9.74 | 9.59 |
| | | | 0.60, 0.01 | 19.74 | 20.78 | 20.11 | 19.79 |
| | | .30,.10 | 0.01, 0.01 | 4.93 | 5.37 | 6.27 | 5.44 |
| | | | 0.20, 0.05 | 9.42 | 10.08 | 10.11 | 9.83 |
| | | | 0.20, 0.20 | 9.43 | 10.06 | 10.15 | 9.87 |
| | | | 0.60, 0.01 | 19.61 | 21.34 | 20.46 | 20.12 |

**Table A9:** RMSE for treatment estimate on $Y_1$ after each of the MI methods under comparison, for scenarios corresponding to missing data mechanisms associated with both individual and cluster-level covariate

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25$, $n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | 4.76 | 4.27 | 4.37 | 4.33 |
| | | | 0.20, 0.05 | 7.07 | 7.11 | 7.08 | 7.16 |
| | | | 0.20, 0.20 | 7.07 | 7.12 | 7.08 | 7.16 |
| | | | 0.60, 0.01 | 14.20 | 14.81 | 14.52 | 14.65 |
| | | .30,.10 | 0.01, 0.01 | 4.68 | 4.67 | 5.08 | 4.71 |
| | | | 0.20, 0.05 | 7.07 | 7.36 | 7.48 | 7.35 |
| | | | 0.20, 0.20 | 7.07 | 7.36 | 7.49 | 7.37 |
| | | | 0.60, 0.01 | 14.20 | 15.08 | 14.67 | 14.74 |
| | High | .20,.20 | 0.01, 0.01 | 4.92 | 4.87 | 5.26 | 4.88 |
| | | | 0.20, 0.05 | 7.14 | 7.65 | 7.54 | 7.47 |
| | | | 0.20, 0.20 | 7.14 | 7.65 | 7.55 | 7.49 |
| | | | 0.60, 0.01 | 14.25 | 15.67 | 14.58 | 14.74 |
| | | .30,.10 | 0.01, 0.01 | 4.88 | 5.22 | 5.70 | 5.30 |
| | | | 0.20, 0.05 | 7.10 | 7.96 | 8.02 | 7.91 |
| | | | 0.20, 0.20 | 7.11 | 7.96 | 8.04 | 7.96 |
| | | | 0.60, 0.01 | 14.07 | 16.05 | 15.13 | 15.14 |
| $J = 25$, $n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | 5.32 | 5.06 | 5.08 | 5.00 |
| | | | 0.20, 0.05 | 12.54 | 13.47 | 13.37 | 13.31 |
| | | | 0.20, 0.20 | 12.56 | 13.47 | 13.37 | 13.31 |
| | | | 0.60, 0.01 | 30.15 | 31.62 | 31.33 | 31.26 |
| | | .30,.10 | 0.01, 0.01 | 5.33 | 5.46 | 5.47 | 5.37 |
| | | | 0.20, 0.05 | 12.62 | 13.77 | 13.54 | 13.45 |
| | | | 0.20, 0.20 | 12.60 | 13.76 | 13.54 | 13.45 |
| | | | 0.60, 0.01 | 30.24 | 31.99 | 31.42 | 31.33 |
| | High | .20,.20 | 0.01, 0.01 | 6.14 | 5.78 | 6.06 | 5.78 |
| | | | 0.20, 0.05 | 12.71 | 14.13 | 14.05 | 13.88 |
| | | | 0.20, 0.20 | 12.74 | 14.13 | 13.99 | 13.89 |
| | | | 0.60, 0.01 | 29.71 | 32.58 | 32.46 | 31.71 |
| | | .30,.10 | 0.01, 0.01 | 6.02 | 6.03 | 6.57 | 6.03 |
| | | | 0.20, 0.05 | 12.48 | 14.18 | 13.92 | 13.98 |
| | | | 0.20, 0.20 | 12.50 | 14.19 | 14.65 | 13.97 |
| | | | 0.60, 0.01 | 29.53 | 32.70 | 31.75 | 31.96 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | 4.64 | 4.32 | 4.51 | 4.35 |
| | | | 0.20, 0.05 | 8.51 | 8.92 | 8.88 | 8.87 |
| | | | 0.20, 0.20 | 8.52 | 8.94 | 8.88 | 8.89 |
| | | | 0.60, 0.01 | 18.55 | 19.53 | 19.16 | 19.16 |
| | | .30,.10 | 0.01, 0.01 | 4.70 | 4.62 | 5.00 | 4.63 |
| | | | 0.20, 0.05 | 8.60 | 9.19 | 9.21 | 9.05 |
| | | | 0.20, 0.20 | 8.60 | 9.19 | 9.21 | 9.05 |
| | | | 0.60, 0.01 | 18.62 | 19.88 | 19.39 | 19.32 |
| | High | .20,.20 | 0.01, 0.01 | 4.90 | 4.94 | 5.43 | 4.93 |
| | | | 0.20, 0.05 | 8.48 | 9.58 | 9.61 | 9.35 |
| | | | 0.20, 0.20 | 8.51 | 9.59 | 9.64 | 9.35 |
| | | | 0.60, 0.01 | 18.62 | 19.88 | 19.39 | 19.32 |
| | | .30,.10 | 0.01, 0.01 | 4.92 | 5.45 | 5.88 | 5.40 |
| | | | 0.20, 0.05 | 8.52 | 10.03 | 9.73 | 9.67 |
| | | | 0.20, 0.20 | 8.54 | 10.03 | 9.75 | 9.71 |
| | | | 0.60, 0.01 | 18.41 | 21.20 | 19.87 | 19.75 |

**Table A10:** RMSE for treatment estimate on $Y_1$ after each of the MI methods under comparison, for scenarios corresponding to missing data mechanisms differential by treatment arm.

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25$, $n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | 6.86 | 4.37 | 4.63 | 4.39 |
| | | | 0.20, 0.05 | 9.69 | 7.14 | 7.25 | 7.16 |
| | | | 0.20, 0.20 | 9.72 | 7.14 | 7.25 | 7.16 |
| | | | 0.60, 0.01 | 16.17 | 14.77 | 14.63 | 14.64 |
| | | .30,.10 | 0.01, 0.01 | 6.64 | 4.74 | 4.96 | 4.71 |
| | | | 0.20, 0.05 | 9.48 | 7.47 | 7.49 | 7.45 |
| | | | 0.20, 0.20 | 9.49 | 7.47 | 7.49 | 7.48 |
| | | | 0.60, 0.01 | 16.06 | 15.11 | 14.77 | 14.76 |
| | High | .20,.20 | 0.01, 0.01 | 7.15 | 4.32 | 4.46 | 4.30 |
| | | | 0.20, 0.05 | 10.12 | 7.24 | 7.15 | 7.09 |
| | | | 0.20, 0.20 | 10.17 | 7.24 | 7.15 | 7.10 |
| | | | 0.60, 0.01 | 16.46 | 15.02 | 14.60 | 14.60 |
| | | .30,.10 | 0.01, 0.01 | 7.36 | 4.42 | 4.65 | 4.46 |
| | | | 0.20, 0.05 | 10.44 | 7.32 | 7.25 | 7.26 |
| | | | 0.20, 0.20 | 10.51 | 7.33 | 7.26 | 7.27 |
| | | | 0.60, 0.01 | 16.90 | 15.16 | 14.60 | 14.65 |
| $J = 5$, $n_j = 50$ | Low | .20,.20 | 0.01, 0.01 | 7.40 | 5.20 | 5.20 | 5.16 |
| | | | 0.20, 0.05 | 14.35 | 13.70 | 13.56 | 13.50 |
| | | | 0.20, 0.20 | 14.41 | 13.69 | 13.56 | 13.50 |
| | | | 0.60, 0.01 | 31.34 | 31.87 | 31.53 | 31.45 |
| | | .30,.10 | 0.01, 0.01 | 7.29 | 5.37 | 5.45 | 5.32 |
| | | | 0.20, 0.05 | 14.11 | 13.71 | 13.65 | 13.54 |
| | | | 0.20, 0.20 | 14.16 | 13.71 | 13.65 | 13.54 |
| | | | 0.60, 0.01 | 31.00 | 31.84 | 31.55 | 31.46 |
| | High | .20,.20 | 0.01, 0.01 | 7.77 | 5.07 | 5.10 | 5.05 |
| | | | 0.20, 0.05 | 14.57 | 13.62 | 13.43 | 13.42 |
| | | | 0.20, 0.20 | 14.61 | 13.62 | 13.42 | 13.44 |
| | | | 0.60, 0.01 | 31.25 | 31.87 | 31.39 | 31.37 |
| | | .30,.10 | 0.01, 0.01 | 8.19 | 5.32 | 8.96 | 5.29 |
| | | | 0.20, 0.05 | 14.86 | 13.83 | 13.61 | 13.68 |
| | | | 0.20, 0.20 | 14.93 | 13.82 | 13.67 | 13.67 |
| | | | 0.60, 0.01 | 31.36 | 32.13 | 31.51 | 31.77 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | 6.59 | 4.41 | 4.55 | 4.45 |
| | | | 0.20, 0.05 | 10.49 | 8.95 | 8.88 | 8.86 |
| | | | 0.20, 0.20 | 10.54 | 8.95 | 8.87 | 8.87 |
| | | | 0.60, 0.01 | 19.87 | 19.46 | 19.15 | 19.13 |
| | | .30,.10 | 0.01, 0.01 | 6.54 | 4.77 | 5.03 | 4.82 |
| | | | 0.20, 0.05 | 10.47 | 9.27 | 9.19 | 9.11 |
| | | | 0.20, 0.20 | 10.50 | 9.27 | 9.20 | 9.13 |
| | | | 0.60, 0.01 | 19.84 | 19.87 | 19.40 | 19.23 |
| | High | .20,.20 | 0.01, 0.01 | 6.92 | 4.36 | 4.48 | 4.39 |
| | | | 0.20, 0.05 | 10.86 | 8.95 | 8.84 | 8.89 |
| | | | 0.20, 0.20 | 10.93 | 8.95 | 8.84 | 8.89 |
| | | | 0.60, 0.01 | 20.01 | 19.55 | 19.17 | 19.15 |
| | | .30,.10 | 0.01, 0.01 | 7.24 | 4.59 | 4.95 | 4.60 |
| | | | 0.20, 0.05 | 11.25 | 9.08 | 9.18 | 9.03 |
| | | | 0.20, 0.20 | 11.31 | 9.08 | 9.17 | 9.04 |
| | | | 0.60, 0.01 | 20.39 | 19.66 | 19.45 | 19.34 |

## Results for $Y_2$

**Table A11:** Percentage bias for treatment effect on $Y_2$ for scenarios corresponding to missing mechanism associated with individual level covariate

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25, n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | -1.62 | -1.46 | -1.45 | -1.55 |
| | | | 0.20, 0.05 | -1.75 | -1.57 | -1.60 | -1.69 |
| | | | 0.20, 0.20 | -1.98 | -1.86 | -1.92 | -2.05 |
| | | | 0.60, 0.01 | -1.61 | -1.42 | -1.45 | -1.53 |
| | | .30,.10 | 0.01, 0.01 | -1.49 | -1.60 | -1.41 | -1.60 |
| | | | 0.20, 0.05 | -1.58 | -1.73 | -1.56 | -1.71 |
| | | | 0.20, 0.20 | -1.80 | -2.02 | -1.88 | -2.00 |
| | | | 0.60, 0.01 | -1.47 | -1.57 | -1.41 | -1.61 |
| | High | .20,.20 | 0.01, 0.01 | -0.69 | -1.84 | -2.23 | -1.82 |
| | | | 0.20, 0.05 | -0.86 | -2.05 | -2.38 | -2.02 |
| | | | 0.20, 0.20 | -1.03 | -2.48 | -2.69 | -2.34 |
| | | | 0.60, 0.01 | -0.69 | -1.85 | -2.22 | -1.81 |
| | | .30,.10 | 0.01, 0.01 | -0.49 | -1.72 | -1.43 | -1.46 |
| | | | 0.20, 0.05 | -0.68 | -1.82 | -1.58 | -1.57 |
| | | | 0.20, 0.20 | -0.97 | -2.06 | -1.90 | -1.91 |
| | | | 0.60, 0.01 | -0.44 | -1.68 | -1.43 | -1.44 |
| $J = 5, n_j = 50$ | Low | .20,.20 | 0.01, 0.01 | -0.74 | -0.01 | -0.25 | -0.26 |
| | | | 0.20, 0.05 | -1.51 | -0.71 | -0.97 | -0.98 |
| | | | 0.20, 0.20 | -3.03 | -2.19 | -2.47 | -2.48 |
| | | | 0.60, 0.01 | -0.75 | 0.00 | -0.26 | -0.25 |
| | | .30,.10 | 0.01, 0.01 | -1.33 | -0.42 | -0.43 | -0.37 |
| | | | 0.20, 0.05 | -2.05 | -1.13 | -1.14 | -1.09 |
| | | | 0.20, 0.20 | -3.52 | -2.63 | -2.64 | -2.60 |
| | | | 0.60, 0.01 | -1.59 | -1.27 | -1.28 | -1.19 |
| | High | .20,.20 | 0.01, 0.01 | -0.59 | -0.83 | -0.77 | -0.98 |
| | | | 0.20, 0.05 | -1.28 | -1.50 | -1.48 | -1.68 |
| | | | 0.20, 0.20 | -2.79 | -2.97 | -2.99 | -3.16 |
| | | | 0.60, 0.01 | -0.57 | -0.80 | -0.75 | -0.97 |
| | | .30,.10 | 0.01, 0.01 | -0.54 | -0.22 | -0.28 | -0.17 |
| | | | 0.20, 0.05 | -1.29 | -0.94 | -0.99 | -0.88 |
| | | | 0.20, 0.20 | -2.82 | -2.48 | -2.49 | -2.37 |
| | | | 0.60, 0.01 | -0.55 | -0.21 | -0.27 | -0.16 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | -0.43 | 0.38 | 0.20 | 0.37 |
| | | | 0.20, 0.05 | -1.24 | -0.37 | -0.57 | -0.42 |
| | | | 0.20, 0.20 | -1.24 | -0.37 | -0.57 | -0.42 |
| | | | 0.60, 0.01 | -0.46 | 0.39 | 0.16 | 0.32 |
| | | .30,.10 | 0.01, 0.01 | 0.03 | -0.01 | 0.03 | -0.03 |
| | | | 0.20, 0.05 | -0.60 | -0.69 | -0.70 | -0.77 |
| | | | 0.20, 0.20 | -2.13 | -2.25 | -2.21 | -2.31 |
| | | | 0.60, 0.01 | 0.00 | 0.00 | -0.03 | -0.08 |
| | High | .20,.20 | 0.01, 0.01 | -1.03 | -0.21 | 0.02 | -0.14 |
| | | | 0.20, 0.05 | -1.65 | -0.95 | -0.65 | -0.89 |
| | | | 0.20, 0.20 | -3.12 | -2.61 | -2.03 | -2.23 |
| | | | 0.60, 0.01 | -1.01 | -0.21 | -0.02 | -0.20 |
| | | .30,.10 | 0.01, 0.01 | -0.05 | 0.28 | 0.58 | 0.20 |
| | | | 0.20, 0.05 | -0.68 | -0.44 | -0.17 | -0.57 |
| | | | 0.20, 0.20 | -2.17 | -2.05 | -1.72 | -2.06 |
| | | | 0.60, 0.01 | -0.01 | 0.28 | 0.53 | 0.17 |

**Table A12:** Percentage bias for treatment effect on $Y_2$ for scenarios corresponding to missing mechanism depending on cluster-level covariate

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25, n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | -1.53 | -1.88 | -1.44 | -1.70 |
| | | | 0.20, 0.05 | -1.79 | -2.13 | -1.65 | -1.93 |
| | | | 0.20, 0.20 | -2.29 | -2.66 | -2.11 | -2.39 |
| | | | 0.60, 0.01 | -1.06 | -0.51 | -0.65 | -0.63 |
| | | .30,.10 | 0.01, 0.01 | -0.49 | -0.95 | -1.00 | -0.90 |
| | | | 0.20, 0.05 | -0.86 | -1.18 | -1.21 | -1.11 |
| | | | 0.20, 0.20 | -1.38 | -1.68 | -1.66 | -1.55 |
| | | | 0.60, 0.01 | -0.47 | -0.95 | -0.99 | -0.88 |
| | High | .20,.20 | 0.01, 0.01 | -1.12 | -1.56 | -1.34 | -1.59 |
| | | | 0.20, 0.05 | -1.43 | -1.80 | -1.59 | -1.81 |
| | | | 0.20, 0.20 | -1.75 | -2.28 | -2.17 | -2.08 |
| | | | 0.60, 0.01 | -1.13 | -1.60 | -1.54 | -1.52 |
| | | .30,.10 | 0.01, 0.01 | -0.83 | -0.98 | -1.14 | -1.16 |
| | | | 0.20, 0.05 | -1.17 | -1.21 | -1.41 | -1.35 |
| | | | 0.20, 0.20 | -0.86 | -0.97 | -1.14 | -1.13 |
| | | | 0.60, 0.01 | -0.87 | -0.95 | -1.20 | -1.11 |
| $J = 5, n_j = 50$ | Low | .20,.20 | 0.01, 0.01 | 0.11 | 0.12 | -0.06 | -0.05 |
| | | | 0.20, 0.05 | -0.53 | -0.44 | -0.60 | -0.66 |
| | | | 0.20, 0.20 | -1.80 | -1.63 | -1.72 | -1.97 |
| | | | 0.60, 0.01 | 0.19 | 0.15 | -0.06 | -0.06 |
| | | .30,.10 | 0.01, 0.01 | 0.01 | -0.30 | -0.39 | -0.43 |
| | | | 0.20, 0.05 | -0.57 | -0.85 | -0.92 | -1.03 |
| | | | 0.20, 0.20 | -1.81 | -2.03 | -2.05 | -2.29 |
| | | | 0.60, 0.01 | 0.07 | -0.28 | -0.39 | -0.41 |
| | High | .20,.20 | 0.01, 0.01 | 0.21 | -0.30 | -0.49 | -0.34 |
| | | | 0.20, 0.05 | -0.34 | -0.75 | -2.32 | -0.96 |
| | | | 0.20, 0.20 | -1.69 | -1.77 | -2.39 | -2.04 |
| | | | 0.60, 0.01 | 0.22 | -0.21 | 0.07 | -0.28 |
| | | .30,.10 | 0.01, 0.01 | 0.47 | -0.21 | -0.54 | -0.18 |
| | | | 0.20, 0.05 | -0.12 | -0.71 | -1.33 | -0.62 |
| | | | 0.20, 0.20 | -0.91 | -1.78 | -2.99 | -1.58 |
| | | | 0.60, 0.01 | 0.40 | -0.16 | -1.11 | -0.18 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | -1.35 | -0.46 | -0.32 | -0.42 |
| | | | 0.20, 0.05 | -1.89 | -0.95 | -0.85 | -0.88 |
| | | | 0.20, 0.20 | -3.18 | -2.02 | -2.10 | -1.95 |
| | | | 0.60, 0.01 | -1.33 | -0.50 | -0.36 | -0.42 |
| | | .30,.10 | 0.01, 0.01 | -0.91 | -0.26 | -0.34 | -0.38 |
| | | | 0.20, 0.05 | -1.33 | -0.78 | -0.89 | -0.94 |
| | | | 0.20, 0.20 | -2.54 | -1.84 | -2.06 | -2.12 |
| | | | 0.60, 0.01 | -0.82 | -0.31 | -0.39 | -0.40 |
| | High | .20,.20 | 0.01, 0.01 | -1.44 | -0.81 | -0.75 | -0.83 |
| | | | 0.20, 0.05 | -1.94 | -1.26 | -1.38 | -1.32 |
| | | | 0.20, 0.20 | -3.11 | -2.26 | -2.57 | -2.17 |
| | | | 0.60, 0.01 | -1.48 | -0.91 | -0.77 | -0.88 |
| | | .30,.10 | 0.01, 0.01 | -1.09 | -0.45 | -0.67 | -0.65 |
| | | | 0.20, 0.05 | -1.62 | -0.91 | -1.20 | -1.13 |
| | | | 0.20, 0.20 | -3.23 | -1.98 | -2.45 | -2.36 |
| | | | 0.60, 0.01 | -1.06 | -0.51 | -0.65 | -0.63 |

**Table A13:** Percentage bias for treatment effect on $Y_2$ for scenarios corresponding to missing mechanism depending on both individual and cluster-level covariates

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25, n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | -1.59 | -2.67 | -2.15 | -2.29 |
| | | | 0.20, 0.05 | -1.84 | -2.93 | -2.37 | -2.54 |
| | | | 0.20, 0.20 | -2.29 | -3.48 | -2.82 | -3.00 |
| | | | 0.60, 0.01 | -1.58 | -2.68 | -2.17 | -2.29 |
| | | .30,.10 | 0.01, 0.01 | -0.66 | -1.71 | -1.66 | -1.59 |
| | | | 0.20, 0.05 | -1.12 | -1.95 | -1.86 | -1.83 |
| | | | 0.20, 0.20 | -1.61 | -2.46 | -2.31 | -2.30 |
| | | | 0.60, 0.01 | -0.72 | -1.70 | -1.64 | -1.57 |
| | High | .20,.20 | 0.01, 0.01 | -0.35 | -2.40 | -2.31 | -2.49 |
| | | | 0.20, 0.05 | -0.65 | -2.72 | -2.47 | -2.84 |
| | | | 0.20, 0.20 | -1.17 | -3.35 | -2.82 | -3.54 |
| | | | 0.60, 0.01 | -0.31 | -2.43 | -2.35 | -2.49 |
| | | .30,.10 | 0.01, 0.01 | -0.22 | -2.29 | -2.57 | -2.47 |
| | | | 0.20, 0.05 | -0.54 | -2.49 | -2.81 | -2.68 |
| | | | 0.20, 0.20 | -1.04 | -2.92 | -3.29 | -3.20 |
| | | | 0.60, 0.01 | -0.23 | -2.30 | -2.61 | -2.44 |
| $J = 5, n_j = 50$ | Low | .20,.20 | 0.01, 0.01 | -0.21 | 0.06 | -0.01 | -0.03 |
| | | | 0.20, 0.05 | -0.87 | -0.49 | -0.55 | -0.63 |
| | | | 0.20, 0.20 | -2.14 | -1.67 | -1.67 | -1.92 |
| | | | 0.60, 0.01 | -0.24 | 0.09 | -0.01 | 0.02 |
| | | .30,.10 | 0.01, 0.01 | -0.39 | -0.25 | -0.35 | -0.48 |
| | | | 0.20, 0.05 | -1.04 | -0.81 | -0.88 | -1.06 |
| | | | 0.20, 0.20 | -2.47 | -2.00 | -2.01 | -2.28 |
| | | | 0.60, 0.01 | -0.46 | -0.26 | -0.35 | -0.43 |
| | High | .20,.20 | 0.01, 0.01 | -0.48 | -0.16 | -1.23 | -0.42 |
| | | | 0.20, 0.05 | -1.14 | -0.56 | -1.69 | -0.96 |
| | | | 0.20, 0.20 | -2.22 | -1.49 | -2.81 | -2.03 |
| | | | 0.60, 0.01 | -0.65 | -0.10 | -0.67 | -0.52 |
| | | .30,.10 | 0.01, 0.01 | -0.12 | -0.07 | -0.42 | -0.52 |
| | | | 0.20, 0.05 | -1.02 | -0.50 | -0.95 | -1.01 |
| | | | 0.20, 0.20 | -2.33 | -1.41 | -2.02 | -2.20 |
| | | | 0.60, 0.01 | -0.39 | -0.07 | -0.44 | -0.45 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | -0.96 | -0.16 | 0.37 | -0.06 |
| | | | 0.20, 0.05 | -1.45 | -0.70 | -0.21 | -0.53 |
| | | | 0.20, 0.20 | -2.87 | -1.83 | -1.45 | -1.59 |
| | | | 0.60, 0.01 | -0.92 | -0.18 | 0.33 | -0.05 |
| | | .30,.10 | 0.01, 0.01 | -0.85 | -0.15 | -0.18 | -0.08 |
| | | | 0.20, 0.05 | -1.27 | -0.74 | -0.79 | -0.67 |
| | | | 0.20, 0.20 | -2.75 | -1.88 | -1.96 | -1.84 |
| | | | 0.60, 0.01 | -0.91 | -0.19 | -0.25 | -0.07 |
| | High | .20,.20 | 0.01, 0.01 | -0.97 | -0.39 | -1.04 | -0.58 |
| | | | 0.20, 0.05 | -1.51 | -0.92 | -1.66 | -1.13 |
| | | | 0.20, 0.20 | -2.82 | -2.17 | -3.00 | -2.20 |
| | | | 0.60, 0.01 | -0.91 | -0.19 | -0.25 | -0.07 |
| | | .30,.10 | 0.01, 0.01 | -0.09 | -0.39 | -0.06 | -0.39 |
| | | | 0.20, 0.05 | -0.43 | -0.95 | -0.66 | -1.03 |
| | | | 0.20, 0.20 | -1.67 | -2.14 | -1.98 | -2.26 |
| | | | 0.60, 0.01 | -0.18 | -0.50 | -0.06 | -0.43 |

**Table A14:** Percentage bias for treatment effect on $Y_2$ for scenarios corresponding to missing mechanism differential by treatment

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25$, $n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | -26.5 | -2.6 | -1.5 | -2.3 |
| | | | 0.20, 0.05 | -29.9 | -2.9 | -1.8 | -2.5 |
| | | | 0.20, 0.20 | -35.8 | -3.5 | -2.5 | -3.0 |
| | | | 0.60, 0.01 | -26.6 | -2.7 | -1.4 | -2.3 |
| | | .30,.10 | 0.01, 0.01 | -24.4 | -1.7 | -1.1 | -1.8 |
| | | | 0.20, 0.05 | -27.8 | -1.9 | -1.4 | -2.0 |
| | | | 0.20, 0.20 | -33.4 | -2.4 | -1.9 | -2.5 |
| | | | 0.60, 0.01 | -24.6 | -1.7 | -1.1 | -1.8 |
| | High | .20,.20 | 0.01, 0.01 | -30.5 | -2.1 | -1.6 | -2.7 |
| | | | 0.20, 0.05 | -34.6 | -2.4 | -2.0 | -2.9 |
| | | | 0.20, 0.20 | -41.4 | -3.0 | -3.0 | -3.4 |
| | | | 0.60, 0.01 | -30.7 | -2.1 | -1.6 | -2.6 |
| | | .30,.10 | 0.01, 0.01 | -31.6 | -2.2 | -1.6 | -2.9 |
| | | | 0.20, 0.05 | -35.9 | -2.5 | -2.0 | -3.2 |
| | | | 0.20, 0.20 | -43.4 | -3.1 | -2.9 | -3.7 |
| | | | 0.60, 0.01 | -31.8 | -2.2 | -1.5 | -2.9 |
| $J = 5$, $n_j = 50$ | Low | .20,.20 | 0.01, 0.01 | -27.1 | -0.6 | -0.5 | -0.6 |
| | | | 0.20, 0.05 | -30.6 | -1.2 | -1.0 | -1.2 |
| | | | 0.20, 0.20 | -34.6 | -2.6 | -2.2 | -2.4 |
| | | | 0.60, 0.01 | -27.4 | -0.7 | -0.5 | -0.7 |
| | | .30,.10 | 0.01, 0.01 | -27.0 | -0.6 | -0.5 | -0.4 |
| | | | 0.20, 0.05 | -30.2 | -1.2 | -1.0 | -0.9 |
| | | | 0.20, 0.20 | -34.1 | -2.6 | -2.2 | -2.1 |
| | | | 0.60, 0.01 | -27.3 | -0.6 | -0.5 | -0.4 |
| | High | .20,.20 | 0.01, 0.01 | -31.4 | -0.6 | -0.6 | -0.4 |
| | | | 0.20, 0.05 | -35.3 | -1.3 | -1.1 | -0.9 |
| | | | 0.20, 0.20 | -40.0 | -2.6 | -2.3 | -2.1 |
| | | | 0.60, 0.01 | -31.7 | -0.7 | -0.6 | -0.4 |
| | | .30,.10 | 0.01, 0.01 | -33.8 | -0.6 | -0.6 | -0.6 |
| | | | 0.20, 0.05 | -37.9 | -1.2 | -1.2 | -1.2 |
| | | | 0.20, 0.20 | -43.3 | -2.5 | -2.4 | -2.3 |
| | | | 0.60, 0.01 | -34.1 | -0.6 | -0.6 | -0.6 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | -26.1 | -0.2 | -0.1 | -0.5 |
| | | | 0.20, 0.05 | -29.7 | -0.7 | -0.8 | -1.2 |
| | | | 0.20, 0.20 | -35.6 | -1.9 | -2.2 | -2.5 |
| | | | 0.60, 0.01 | -26.3 | -0.2 | -0.2 | -0.6 |
| | | .30,.10 | 0.01, 0.01 | -25.3 | 0.0 | 0.2 | 0.0 |
| | | | 0.20, 0.05 | -28.7 | -0.6 | -0.4 | -0.6 |
| | | | 0.20, 0.20 | -34.4 | -1.9 | -1.6 | -1.8 |
| | | | 0.60, 0.01 | -25.4 | -0.1 | 0.2 | 0.0 |
| | High | .20,.20 | 0.01, 0.01 | -30.2 | -0.4 | -0.6 | -0.5 |
| | | | 0.20, 0.05 | -34.6 | -0.9 | -1.3 | -1.0 |
| | | | 0.20, 0.20 | -41.7 | -2.2 | -2.8 | -2.4 |
| | | | 0.60, 0.01 | -30.5 | -0.4 | -0.6 | -0.5 |
| | | .30,.10 | 0.01, 0.01 | -31.7 | -0.3 | -0.2 | -0.6 |
| | | | 0.20, 0.05 | -36.3 | -0.8 | -0.9 | -1.1 |
| | | | 0.20, 0.20 | -43.8 | -2.1 | -2.4 | -2.4 |
| | | | 0.60, 0.01 | -32.0 | -0.3 | -0.3 | -0.5 |

**Table A15:** Coverage rate and average width (AW) of the 95% CI for treatment effect on $Y_2$ after each of the MI strategies, when the missing mechanism depends only on individual level covariate

| Design | $\eta$ | Prob. Miss | ICC | CCA | | SMI | | FMI | | MMI | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | CR | AW | CR | AW | CR | AW | CR | AW |
| $J = 25$, | Low | .20,.20 | 0.01, 0.01 | 94.4 | 9.4 | 94.8 | 8.5 | 97.3 | 10.1 | 95.8 | 8.7 |
| $n_j = 10$ | | | 0.20, 0.05 | 94.0 | 10.3 | 94.1 | 9.2 | 96.5 | 11.0 | 94.5 | 9.5 |
| | | | 0.20, 0.20 | 93.8 | 14.3 | 90.4 | 12.1 | 95.5 | 14.8 | 93.0 | 13.5 |
| | | | 0.60, 0.01 | 94.7 | 9.4 | 95.1 | 8.6 | 97.2 | 10.0 | 95.8 | 8.7 |
| | | .30,.10 | 0.01, 0.01 | 95.5 | 9.5 | 95.2 | 8.0 | 96.7 | 8.8 | 95.7 | 8.1 |
| | | | 0.20, 0.05 | 94.8 | 10.4 | 93.4 | 8.9 | 95.9 | 9.8 | 94.1 | 9.0 |
| | | | 0.20, 0.20 | 93.6 | 14.3 | 91.8 | 12.4 | 94.5 | 13.9 | 93.8 | 13.3 |
| | | | 0.60, 0.01 | 95.7 | 9.5 | 95.6 | 8.1 | 96.5 | 8.7 | 95.6 | 8.1 |
| | High | .20,.20 | 0.01, 0.01 | 96.2 | 9.4 | 94.7 | 9.3 | 96.9 | 11.3 | 94.3 | 9.4 |
| | | | 0.20, 0.05 | 95.6 | 10.3 | 92.2 | 9.8 | 96.3 | 12.2 | 93.5 | 10.1 |
| | | | 0.20, 0.20 | 93.9 | 14.3 | 89.5 | 12.4 | 95.6 | 15.7 | 92.8 | 13.9 |
| | | | 0.60, 0.01 | 96.2 | 9.4 | 94.8 | 9.3 | 96.7 | 11.2 | 94.0 | 9.4 |
| | | .30,.10 | 0.01, 0.01 | 95.4 | 9.4 | 94.7 | 8.5 | 97.3 | 9.8 | 94.7 | 8.7 |
| | | | 0.20, 0.05 | 94.1 | 10.3 | 93.2 | 9.2 | 97.1 | 10.7 | 94.2 | 9.5 |
| | | | 0.20, 0.20 | 93.3 | 14.3 | 90.7 | 12.4 | 95.3 | 14.6 | 93.3 | 13.6 |
| | | | 0.60, 0.01 | 95.5 | 9.5 | 94.9 | 8.6 | 97.4 | 9.7 | 94.5 | 8.7 |
| $J = 5$, | Low | .20,.20 | 0.01, 0.01 | 94.9 | 10.5 | 95.1 | 9.4 | 97.1 | 10.8 | 95.7 | 9.8 |
| $n_j = 50$ | | | 0.20, 0.05 | 91.8 | 13.9 | 89.4 | 11.8 | 94.1 | 14.3 | 92.2 | 13.2 |
| | | | 0.20, 0.20 | 89.0 | 25.5 | 83.3 | 20.4 | 92.0 | 25.8 | 90.3 | 25.0 |
| | | | 0.60, 0.01 | 95.5 | 10.6 | 95.4 | 9.5 | 97.0 | 10.6 | 95.6 | 9.8 |
| | | .30,.10 | 0.01, 0.01 | 94.8 | 10.6 | 94.2 | 9.0 | 95.9 | 9.8 | 94.8 | 9.3 |
| | | | 0.20, 0.05 | 91.3 | 14.0 | 89.8 | 12.2 | 93.3 | 13.5 | 91.8 | 13.0 |
| | | | 0.20, 0.20 | 90.8 | 25.4 | 87.1 | 22.3 | 91.2 | 25.4 | 90.5 | 25.0 |
| | | | 0.60, 0.01 | 94.2 | 21.2 | 93.9 | 18.3 | 95.6 | 19.5 | 94.9 | 18.6 |
| | High | .20,.20 | 0.01, 0.01 | 94.5 | 10.5 | 94.6 | 10.0 | 97.5 | 11.8 | 95.9 | 10.5 |
| | | | 0.20, 0.05 | 91.0 | 13.9 | 87.5 | 12.0 | 94.4 | 15.1 | 91.6 | 13.6 |
| | | | 0.20, 0.20 | 90.3 | 25.5 | 80.6 | 19.4 | 92.0 | 26.3 | 89.4 | 25.2 |
| | | | 0.60, 0.01 | 94.4 | 10.6 | 94.6 | 10.1 | 97.2 | 11.6 | 96.3 | 10.6 |
| | | .30,.10 | 0.01, 0.01 | 94.0 | 10.6 | 94.0 | 9.4 | 96.5 | 10.6 | 95.0 | 9.8 |
| | | | 0.20, 0.05 | 91.3 | 14.0 | 89.6 | 12.0 | 93.7 | 14.1 | 91.8 | 13.2 |
| | | | 0.20, 0.20 | 90.4 | 25.5 | 85.0 | 20.9 | 91.6 | 25.7 | 90.9 | 25.0 |
| | | | 0.60, 0.01 | 94.2 | 10.6 | 94.7 | 9.5 | 96.4 | 10.4 | 95.8 | 9.8 |
| $J = 15$, | Low | .20,.20 | 0.01, 0.01 | 95.0 | 9.0 | 92.7 | 8.1 | 96.8 | 9.7 | 93.6 | 8.3 |
| unbalanced | | | 0.20, 0.05 | 93.3 | 10.7 | 90.9 | 9.3 | 96.1 | 11.3 | 91.9 | 9.8 |
| | | | 0.20, 0.20 | 93.3 | 10.7 | 90.9 | 9.3 | 96.1 | 11.3 | 91.9 | 9.8 |
| | | | 0.60, 0.01 | 94.8 | 9.0 | 93.4 | 8.2 | 96.4 | 9.5 | 93.4 | 8.3 |
| | | .30,.10 | 0.01, 0.01 | 94.2 | 9.0 | 94.4 | 7.7 | 96.0 | 8.5 | 93.9 | 7.8 |
| | | | 0.20, 0.05 | 91.8 | 10.6 | 91.5 | 9.3 | 94.2 | 10.3 | 92.7 | 9.6 |
| | | | 0.20, 0.20 | 92.7 | 16.7 | 90.3 | 14.6 | 94.5 | 16.6 | 93.5 | 16.0 |
| | | | 0.60, 0.01 | 94.4 | 9.1 | 94.3 | 7.8 | 95.6 | 8.4 | 94.3 | 7.8 |
| | High | .20,.20 | 0.01, 0.01 | 93.6 | 9.0 | 94.5 | 8.7 | 97.5 | 10.8 | 94.9 | 9.0 |
| | | | 0.20, 0.05 | 92.9 | 10.6 | 91.4 | 9.8 | 97.3 | 12.3 | 93.1 | 10.4 |
| | | | 0.20, 0.20 | 93.2 | 16.8 | 86.5 | 13.6 | 95.9 | 18.0 | 92.7 | 16.4 |
| | | | 0.60, 0.01 | 94.5 | 9.0 | 94.6 | 8.8 | 97.3 | 10.6 | 94.9 | 9.0 |
| | | .30,.10 | 0.01, 0.01 | 94.4 | 9.0 | 94.3 | 8.1 | 96.3 | 9.3 | 94.6 | 8.3 |
| | | | 0.20, 0.05 | 93.3 | 10.7 | 92.2 | 9.4 | 96.0 | 11.1 | 93.2 | 9.9 |
| | | | 0.20, 0.20 | 93.9 | 16.8 | 89.2 | 14.1 | 94.8 | 17.1 | 93.3 | 16.2 |
| | | | 0.60, 0.01 | 94.3 | 9.1 | 94.3 | 8.2 | 96.1 | 9.2 | 94.7 | 8.3 |

**Table A16:** Coverage rate and average width (AW) of the 95 CI for treatment effect on $Y_2$ after each of the MI strategies, when the missing mechanism depends on cluster-level covariate.

| Design | $\eta$ | Prob. Miss | ICC | CCA | | SMI | | FMI | | MMI | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | CR | AW | CR | AW | CR | AW | CR | AW |
| $J = 25$, | Low | .20,.20 | 0.01, 0.01 | 95.6 | 9.7 | 95.3 | 9.1 | 99.2 | 11.8 | 95.2 | 9.2 |
| $n_j = 10$ | | | 0.20, 0.05 | 95.1 | 10.7 | 94.0 | 10.0 | 98.6 | 12.8 | 94.8 | 10.2 |
| | | | 0.20, 0.20 | 94.3 | 14.9 | 92.2 | 13.4 | 97.2 | 16.4 | 93.7 | 14.2 |
| | | | 0.60, 0.01 | 94.0 | 9.6 | 95.4 | 8.8 | 98.5 | 11.9 | 95.6 | 9.1 |
| | | .30,.10 | 0.01, 0.01 | 95.7 | 9.7 | 95.6 | 8.4 | 97.7 | 9.7 | 95.1 | 8.4 |
| | | | 0.20, 0.05 | 94.7 | 10.8 | 93.9 | 9.4 | 96.9 | 10.8 | 94.2 | 9.5 |
| | | | 0.20, 0.20 | 93.8 | 14.9 | 92.0 | 13.2 | 95.6 | 14.9 | 93.5 | 13.8 |
| | | | 0.60, 0.01 | 95.7 | 9.8 | 96.1 | 8.4 | 97.6 | 9.7 | 95.8 | 8.5 |
| | High | .20,.20 | 0.01, 0.01 | 96.6 | 9.9 | 95.6 | 10.2 | 99.5 | 14.8 | 96.5 | 10.2 |
| | | | 0.20, 0.05 | 95.4 | 11.0 | 95.8 | 11.0 | 99.2 | 15.6 | 95.6 | 11.2 |
| | | | 0.20, 0.20 | 94.9 | 15.2 | 93.4 | 14.2 | 98.1 | 18.7 | 94.9 | 15.1 |
| | | | 0.60, 0.01 | 97.0 | 10.0 | 95.9 | 10.3 | 99.5 | 14.9 | 96.6 | 10.3 |
| | | .30,.10 | 0.01, 0.01 | 95.3 | 10.0 | 95.6 | 9.1 | 98.7 | 12.3 | 95.4 | 9.2 |
| | | | 0.20, 0.05 | 94.2 | 11.0 | 94.2 | 10.0 | 98.5 | 13.2 | 94.6 | 10.3 |
| | | | 0.20, 0.20 | 95.9 | 10.1 | 95.9 | 9.1 | 98.8 | 12.3 | 95.9 | 9.3 |
| | | | 0.60, 0.01 | 95.9 | 10.0 | 95.9 | 9.2 | 98.7 | 12.3 | 95.8 | 9.3 |
| $J = 5$, | Low | .20,.20 | 0.01, 0.01 | 94.5 | 10.9 | 95.5 | 10.5 | 97.4 | 12.1 | 95.6 | 10.9 |
| $n_j = 50$ | | | 0.20, 0.05 | 91.4 | 14.5 | 91.5 | 13.7 | 94.5 | 15.7 | 93.1 | 14.6 |
| | | | 0.20, 0.20 | 90.4 | 26.3 | 88.5 | 23.8 | 92.4 | 27.3 | 91.3 | 26.4 |
| | | | 0.60, 0.01 | 94.5 | 11.1 | 95.7 | 10.6 | 97.2 | 11.9 | 96.2 | 11.0 |
| | | .30,.10 | 0.01, 0.01 | 94.3 | 10.9 | 94.6 | 9.7 | 96.3 | 10.5 | 94.5 | 9.9 |
| | | | 0.20, 0.05 | 91.0 | 14.6 | 90.9 | 13.3 | 92.8 | 14.4 | 92.2 | 13.9 |
| | | | 0.20, 0.20 | 90.1 | 26.1 | 89.1 | 24.5 | 91.4 | 26.5 | 90.8 | 26.1 |
| | | | 0.60, 0.01 | 94.7 | 11.1 | 95.2 | 9.7 | 96.1 | 10.4 | 94.9 | 10.0 |
| | High | .20,.20 | 0.01, 0.01 | 93.2 | 11.4 | 95.4 | 12.4 | 97.8 | 17.6 | 96.4 | 13.0 |
| | | | 0.20, 0.05 | 90.3 | 14.9 | 91.0 | 15.2 | 95.6 | 20.5 | 92.7 | 16.6 |
| | | | 0.20, 0.20 | 90.2 | 26.5 | 87.5 | 24.8 | 93.1 | 30.9 | 91.0 | 28.0 |
| | | | 0.60, 0.01 | 93.5 | 11.6 | 95.7 | 12.4 | 97.8 | 18.3 | 97.2 | 13.3 |
| | | .30,.10 | 0.01, 0.01 | 94.6 | 11.3 | 94.8 | 10.9 | 98.0 | 13.5 | 95.6 | 11.4 |
| | | | 0.20, 0.05 | 90.2 | 15.0 | 91.2 | 14.1 | 94.5 | 17.5 | 92.9 | 15.0 |
| | | | 0.20, 0.20 | 89.0 | 26.4 | 89.3 | 24.7 | 92.0 | 28.5 | 90.7 | 26.9 |
| | | | 0.60, 0.01 | 95.2 | 11.6 | 95.1 | 10.9 | 97.8 | 14.7 | 95.3 | 11.5 |
| $J = 15$, | Low | .20,.20 | 0.01, 0.01 | 94.1 | 9.2 | 95.1 | 8.8 | 98.4 | 11.2 | 95.3 | 8.9 |
| unbalanced | | | 0.20, 0.05 | 93.0 | 11.1 | 93.2 | 10.3 | 97.7 | 12.9 | 94.3 | 10.7 |
| | | | 0.20, 0.20 | 93.9 | 17.4 | 90.7 | 15.5 | 96.3 | 18.8 | 93.4 | 17.0 |
| | | | 0.60, 0.01 | 94.7 | 9.3 | 95.3 | 8.8 | 98.3 | 11.1 | 95.6 | 8.9 |
| | | .30,.10 | 0.01, 0.01 | 94.4 | 9.3 | 95.2 | 8.1 | 97.0 | 9.3 | 95.1 | 8.2 |
| | | | 0.20, 0.05 | 93.0 | 11.2 | 92.4 | 9.9 | 96.0 | 11.3 | 92.8 | 10.1 |
| | | | 0.20, 0.20 | 92.8 | 17.4 | 92.5 | 15.7 | 94.6 | 17.6 | 93.4 | 16.7 |
| | | | 0.60, 0.01 | 94.3 | 9.4 | 95.7 | 8.1 | 96.8 | 9.2 | 95.5 | 8.2 |
| | High | .20,.20 | 0.01, 0.01 | 93.6 | 9.5 | 94.5 | 9.9 | 98.7 | 14.9 | 95.1 | 10.1 |
| | | | 0.20, 0.05 | 92.3 | 11.5 | 93.2 | 11.3 | 98.1 | 16.3 | 93.8 | 11.7 |
| | | | 0.20, 0.20 | 92.7 | 17.8 | 90.1 | 16.2 | 96.7 | 21.2 | 92.7 | 17.8 |
| | | | 0.60, 0.01 | 94.4 | 9.7 | 95.0 | 9.9 | 98.5 | 15.0 | 95.2 | 10.1 |
| | | .30,.10 | 0.01, 0.01 | 93.8 | 9.6 | 95.1 | 8.8 | 98.5 | 12.0 | 95.7 | 9.0 |
| | | | 0.20, 0.05 | 92.2 | 11.4 | 93.1 | 10.4 | 98.0 | 13.6 | 94.4 | 10.9 |
| | | | 0.20, 0.20 | 92.4 | 17.8 | 90.5 | 16.0 | 96.0 | 19.2 | 93.4 | 17.3 |
| | | | 0.60, 0.01 | 94.0 | 9.6 | 95.4 | 8.8 | 98.5 | 11.9 | 95.6 | 9.1 |

**Table A17:** Coverage rate and average width (AW) of the 95 CI for treatment effect on $Y_2$ after each of the MI strategies, when the missing mechanism depends on both individual and cluster-level covariates

| Design | $\eta$ | Prob. Miss | ICC | CCA | | SMI | | FMI | | MMI | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | CR | AW | CR | AW | CR | AW | CR | AW |
| $J = 25$, | Low | .20,.20 | 0.01, 0.01 | 95.2 | 9.6 | 95.4 | 9.0 | 98.8 | 11.2 | 95.3 | 9.1 |
| $n_j = 10$ | | | 0.20, 0.05 | 93.7 | 10.3 | 94.5 | 9.9 | 98.3 | 12.1 | 94.7 | 10.1 |
| | | | 0.20, 0.20 | 94.8 | 14.0 | 91.6 | 13.3 | 96.2 | 15.9 | 93.8 | 14.2 |
| | | | 0.60, 0.01 | 95.7 | 9.6 | 95.7 | 9.1 | 98.7 | 11.1 | 95.4 | 9.2 |
| | | .30,.10 | 0.01, 0.01 | 95.6 | 9.6 | 95.3 | 8.3 | 97.1 | 9.4 | 95.5 | 8.4 |
| | | | 0.20, 0.05 | 94.9 | 10.3 | 94.2 | 9.3 | 96.8 | 10.5 | 94.3 | 9.5 |
| | | | 0.20, 0.20 | 93.9 | 14.1 | 91.9 | 13.2 | 95.5 | 14.7 | 94.2 | 13.9 |
| | | | 0.60, 0.01 | 95.7 | 9.7 | 95.5 | 8.4 | 97.4 | 9.4 | 95.6 | 8.4 |
| | High | .20,.20 | 0.01, 0.01 | 95.5 | 9.8 | 95.3 | 10.4 | 99.0 | 14.0 | 95.3 | 10.5 |
| | | | 0.20, 0.05 | 95.1 | 10.4 | 94.4 | 11.2 | 98.6 | 14.7 | 94.3 | 11.4 |
| | | | 0.20, 0.20 | 95.0 | 13.9 | 92.9 | 14.3 | 97.5 | 17.9 | 94.2 | 15.3 |
| | | | 0.60, 0.01 | 96.3 | 9.9 | 95.9 | 10.5 | 98.8 | 14.0 | 95.4 | 10.5 |
| | | .30,.10 | 0.01, 0.01 | 96.1 | 9.9 | 95.3 | 9.4 | 98.5 | 12.0 | 95.3 | 9.5 |
| | | | 0.20, 0.05 | 95.6 | 10.5 | 94.2 | 10.2 | 97.9 | 12.9 | 94.1 | 10.5 |
| | | | 0.20, 0.20 | 94.5 | 14.0 | 91.1 | 13.7 | 96.5 | 16.5 | 94.0 | 14.6 |
| | | | 0.60, 0.01 | 96.1 | 10.0 | 95.6 | 9.5 | 98.5 | 11.9 | 95.2 | 9.5 |
| $J = 5$, | Low | .20,.20 | 0.01, 0.01 | 95.2 | 10.7 | 95.5 | 10.4 | 97.3 | 11.7 | 96.0 | 10.7 |
| $n_j = 50$ | | | 0.20, 0.05 | 92.3 | 13.3 | 90.3 | 13.5 | 94.2 | 15.4 | 92.2 | 14.4 |
| | | | 0.20, 0.20 | 90.7 | 24.0 | 87.7 | 23.7 | 91.6 | 27.2 | 90.4 | 26.4 |
| | | | 0.60, 0.01 | 95.2 | 10.9 | 95.6 | 10.5 | 96.9 | 11.6 | 96.5 | 10.8 |
| | | .30,.10 | 0.01, 0.01 | 94.6 | 10.7 | 95.0 | 9.7 | 96.2 | 10.3 | 95.2 | 9.8 |
| | | | 0.20, 0.05 | 90.3 | 13.4 | 90.6 | 13.2 | 92.1 | 14.3 | 91.7 | 13.8 |
| | | | 0.20, 0.20 | 89.4 | 24.1 | 88.7 | 24.4 | 91.0 | 26.5 | 90.7 | 26.1 |
| | | | 0.60, 0.01 | 95.2 | 10.9 | 94.7 | 9.7 | 96.1 | 10.2 | 95.1 | 9.9 |
| | High | .20,.20 | 0.01, 0.01 | 93.1 | 12.0 | 95.7 | 12.2 | 97.7 | 15.6 | 96.9 | 12.6 |
| | | | 0.20, 0.05 | 91.8 | 13.8 | 92.3 | 14.9 | 95.3 | 18.7 | 94.0 | 16.0 |
| | | | 0.20, 0.20 | 89.9 | 23.2 | 87.7 | 24.2 | 92.2 | 28.8 | 91.4 | 27.3 |
| | | | 0.60, 0.01 | 93.0 | 12.0 | 95.9 | 12.2 | 97.9 | 14.4 | 96.9 | 12.8 |
| | | .30,.10 | 0.01, 0.01 | 94.0 | 12.0 | 96.1 | 10.9 | 97.4 | 12.3 | 96.2 | 11.2 |
| | | | 0.20, 0.05 | 92.4 | 13.8 | 91.2 | 14.0 | 94.1 | 15.8 | 92.3 | 14.8 |
| | | | 0.20, 0.20 | 89.8 | 23.2 | 88.6 | 24.1 | 91.9 | 27.3 | 90.7 | 26.7 |
| | | | 0.60, 0.01 | 94.6 | 11.9 | 96.3 | 10.9 | 97.1 | 12.2 | 96.6 | 11.3 |
| $J = 15$, | Low | .20,.20 | 0.01, 0.01 | 94.2 | 9.1 | 94.6 | 8.6 | 97.6 | 10.6 | 95.1 | 8.8 |
| unbalanced | | | 0.20, 0.05 | 93.0 | 10.4 | 92.2 | 10.2 | 97.2 | 12.3 | 94.2 | 10.5 |
| | | | 0.20, 0.20 | 94.7 | 16.3 | 89.9 | 15.4 | 96.1 | 18.4 | 93.5 | 16.9 |
| | | | 0.60, 0.01 | 94.5 | 9.2 | 94.8 | 8.8 | 97.4 | 10.5 | 95.1 | 8.8 |
| | | .30,.10 | 0.01, 0.01 | 94.4 | 9.1 | 93.9 | 8.0 | 96.5 | 9.0 | 94.3 | 8.1 |
| | | | 0.20, 0.05 | 93.1 | 10.4 | 92.3 | 9.8 | 95.3 | 11.0 | 92.9 | 10.1 |
| | | | 0.20, 0.20 | 93.1 | 16.3 | 91.1 | 15.7 | 93.8 | 17.4 | 93.6 | 16.7 |
| | | | 0.60, 0.01 | 94.7 | 9.2 | 94.3 | 8.1 | 96.2 | 8.9 | 94.4 | 8.2 |
| | High | .20,.20 | 0.01, 0.01 | 93.9 | 9.6 | 95.0 | 10.0 | 98.1 | 13.5 | 95.4 | 10.2 |
| | | | 0.20, 0.05 | 92.2 | 10.7 | 92.4 | 11.3 | 97.9 | 14.9 | 93.6 | 11.8 |
| | | | 0.20, 0.20 | 92.5 | 16.0 | 90.5 | 16.1 | 96.5 | 20.2 | 94.0 | 17.8 |
| | | | 0.60, 0.01 | 94.7 | 9.2 | 94.3 | 8.1 | 96.2 | 8.9 | 94.4 | 8.2 |
| | | .30,.10 | 0.01, 0.01 | 94.1 | 9.7 | 94.6 | 9.0 | 97.8 | 11.4 | 95.3 | 9.2 |
| | | | 0.20, 0.05 | 92.6 | 10.7 | 92.3 | 10.5 | 96.5 | 13.0 | 93.4 | 10.9 |
| | | | 0.20, 0.20 | 93.3 | 16.0 | 90.4 | 15.8 | 95.4 | 18.8 | 93.7 | 17.3 |
| | | | 0.60, 0.01 | 94.4 | 9.7 | 94.4 | 9.1 | 97.5 | 11.3 | 95.1 | 9.2 |

**Table A18:** Coverage rate and average width (AW) of the 95% CI for treatment effect on $Y_2$ after each of the MI strategies, when the missing mechanism is differential by treatment arm.

| Design | $\eta$ | Prob. Miss | ICC | CCA | | SMI | | FMI | | MMI | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | CR | AW | CR | AW | CR | AW | CR | AW |
| $J = 25$, | Low | .20,.20 | 0.01, 0.01 | 81.2 | 18.6 | 95.5 | 17.9 | 98.8 | 22.3 | 94.9 | 17.5 |
| $n_j = 10$ | | | 0.20, 0.05 | 84.7 | 27.6 | 92.6 | 26.2 | 96.5 | 31.2 | 93.1 | 27.4 |
| | | | 0.20, 0.20 | 83.9 | 27.7 | 92.8 | 26.3 | 96.3 | 31.2 | 93.1 | 27.2 |
| | | | 0.60, 0.01 | 91.3 | 56.0 | 90.7 | 51.4 | 95.1 | 58.7 | 94.4 | 56.9 |
| | | .30,.10 | 0.01, 0.01 | 82.2 | 18.7 | 95.5 | 19.4 | 99.7 | 26.1 | 94.9 | 18.9 |
| | | | 0.20, 0.05 | 85.2 | 27.7 | 92.5 | 26.9 | 97.5 | 34.0 | 93.0 | 28.2 |
| | | | 0.20, 0.20 | 84.6 | 27.7 | 92.6 | 27.0 | 97.5 | 34.0 | 92.4 | 27.9 |
| | | | 0.60, 0.01 | 91.7 | 56.0 | 90.7 | 50.8 | 95.2 | 60.1 | 93.5 | 57.5 |
| | High | .20,.20 | 0.01, 0.01 | 75.1 | 17.4 | 95.6 | 17.3 | 98.7 | 21.4 | 95.6 | 17.2 |
| | | | 0.20, 0.05 | 81.2 | 26.7 | 91.8 | 26.2 | 96.8 | 30.6 | 93.8 | 27.4 |
| | | | 0.20, 0.20 | 81.2 | 26.6 | 91.9 | 26.2 | 96.8 | 30.6 | 93.7 | 27.2 |
| | | | 0.60, 0.01 | 89.7 | 55.2 | 91.0 | 52.3 | 94.6 | 58.4 | 94.4 | 56.9 |
| | | .30,.10 | 0.01, 0.01 | 73.7 | 17.8 | 96.2 | 18.5 | 99.1 | 23.4 | 95.8 | 18.1 |
| | | | 0.20, 0.05 | 78.4 | 26.8 | 92.2 | 26.8 | 96.8 | 32.0 | 93.2 | 28.0 |
| | | | 0.20, 0.20 | 78.6 | 26.8 | 92.3 | 26.8 | 96.8 | 32.1 | 93.6 | 27.8 |
| | | | 0.60, 0.01 | 89.3 | 55.3 | 90.4 | 52.2 | 95.0 | 59.1 | 94.4 | 57.4 |
| $J = 5$, | Low | .20,.20 | 0.01, 0.01 | 82.0 | 20.3 | 94.8 | 20.2 | 96.5 | 22.6 | 95.6 | 20.2 |
| $n_j = 50$ | | | 0.20, 0.05 | 87.4 | 48.1 | 87.4 | 47.0 | 92.4 | 53.1 | 91.0 | 51.1 |
| | | | 0.20, 0.20 | 87.2 | 48.4 | 87.8 | 47.0 | 92.6 | 53.1 | 90.9 | 51.1 |
| | | | 0.60, 0.01 | 89.9 | 116.1 | 87.5 | 107.3 | 91.1 | 121.5 | 90.9 | 120.2 |
| | | .30,.10 | 0.01, 0.01 | 83.2 | 20.3 | 94.8 | 21.8 | 97.2 | 25.4 | 95.3 | 21.7 |
| | | | 0.20, 0.05 | 86.6 | 47.9 | 87.2 | 46.3 | 92.1 | 54.3 | 90.3 | 51.2 |
| | | | 0.20, 0.20 | 87.7 | 48.2 | 87.2 | 46.4 | 92.4 | 54.1 | 90.2 | 51.0 |
| | | | 0.60, 0.01 | 89.0 | 115.7 | 85.3 | 103.7 | 91.0 | 121.5 | 90.7 | 120.0 |
| | High | .20,.20 | 0.01, 0.01 | 75.6 | 19.4 | 94.8 | 19.8 | 96.1 | 21.9 | 94.1 | 20.0 |
| | | | 0.20, 0.05 | 85.4 | 47.3 | 88.9 | 47.9 | 92.0 | 52.7 | 91.4 | 51.3 |
| | | | 0.20, 0.20 | 85.3 | 47.5 | 88.9 | 47.9 | 92.1 | 52.6 | 91.4 | 51.3 |
| | | | 0.60, 0.01 | 89.7 | 115.0 | 87.9 | 110.2 | 91.2 | 121.0 | 91.0 | 120.2 |
| | | .30,.10 | 0.01, 0.01 | 74.3 | 20.0 | 94.6 | 20.9 | 97.1 | 27.0 | 95.1 | 21.0 |
| | | | 0.20, 0.05 | 85.1 | 47.6 | 87.6 | 47.7 | 92.8 | 54.3 | 90.1 | 51.7 |
| | | | 0.20, 0.20 | 84.9 | 47.8 | 87.5 | 47.7 | 92.4 | 53.8 | 90.2 | 51.6 |
| | | | 0.60, 0.01 | 89.1 | 115.0 | 86.9 | 108.4 | 91.0 | 123.7 | 90.8 | 120.9 |
| $J = 15$, | Low | .20,.20 | 0.01, 0.01 | 81.0 | 17.7 | 93.9 | 17.0 | 97.4 | 21.0 | 93.2 | 16.9 |
| unbalanced | | | 0.20, 0.05 | 85.9 | 32.1 | 89.9 | 30.3 | 95.7 | 36.1 | 93.0 | 32.9 |
| | | | 0.20, 0.20 | 85.9 | 32.1 | 89.7 | 30.3 | 96.0 | 35.9 | 93.1 | 32.7 |
| | | | 0.60, 0.01 | 91.2 | 70.3 | 89.6 | 63.7 | 94.3 | 74.0 | 93.5 | 72.4 |
| | | .30,.10 | 0.01, 0.01 | 82.6 | 17.8 | 93.8 | 18.4 | 98.5 | 24.6 | 93.9 | 18.3 |
| | | | 0.20, 0.05 | 85.7 | 32.1 | 88.0 | 30.4 | 96.4 | 38.3 | 92.2 | 33.4 |
| | | | 0.20, 0.20 | 85.5 | 32.1 | 88.2 | 30.4 | 96.2 | 38.1 | 91.5 | 33.1 |
| | | | 0.60, 0.01 | 91.9 | 70.5 | 87.4 | 62.1 | 94.3 | 75.1 | 94.0 | 72.9 |
| | High | .20,.20 | 0.01, 0.01 | 74.9 | 16.6 | 93.5 | 16.7 | 97.6 | 20.4 | 93.6 | 16.8 |
| | | | 0.20, 0.05 | 83.0 | 31.1 | 90.9 | 30.8 | 96.0 | 35.6 | 92.9 | 33.0 |
| | | | 0.20, 0.20 | 83.0 | 31.2 | 90.6 | 30.7 | 95.9 | 35.5 | 92.8 | 32.8 |
| | | | 0.60, 0.01 | 91.0 | 69.5 | 89.7 | 65.5 | 94.6 | 73.6 | 93.8 | 72.4 |
| | | .30,.10 | 0.01, 0.01 | 73.4 | 17.1 | 94.3 | 17.5 | 97.4 | 22.9 | 93.8 | 17.7 |
| | | | 0.20, 0.05 | 82.5 | 31.4 | 90.7 | 30.8 | 96.0 | 37.3 | 93.5 | 33.4 |
| | | | 0.20, 0.20 | 82.1 | 31.4 | 91.0 | 30.8 | 96.2 | 36.9 | 93.0 | 33.1 |
| | | | 0.60, 0.01 | 90.5 | 69.7 | 89.7 | 64.5 | 94.0 | 74.4 | 93.8 | 72.8 |

**Table A19:** RMSE for treatment estimate on $Y_2$ after each of the MI methods under comparison, for scenarios corresponding to missing data mechanisms depending on individual-level covariate

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25, n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | 2.33 | 2.13 | 2.16 | 2.14 |
| | | | 0.20, 0.05 | 2.66 | 2.47 | 2.49 | 2.48 |
| | | | 0.20, 0.20 | 3.76 | 3.62 | 3.61 | 3.61 |
| | | | 0.60, 0.01 | 2.34 | 2.13 | 2.16 | 2.15 |
| | | .30,.10 | 0.01, 0.01 | 2.33 | 2.00 | 2.01 | 1.99 |
| | | | 0.20, 0.05 | 2.65 | 2.35 | 2.35 | 2.34 |
| | | | 0.20, 0.20 | 3.74 | 3.52 | 3.49 | 3.49 |
| | | | 0.60, 0.01 | 2.33 | 2.00 | 2.01 | 1.99 |
| | High | .20,.20 | 0.01, 0.01 | 2.32 | 2.40 | 2.46 | 2.38 |
| | | | 0.20, 0.05 | 2.64 | 2.72 | 2.76 | 2.70 |
| | | | 0.20, 0.20 | 3.74 | 3.85 | 3.82 | 3.80 |
| | | | 0.60, 0.01 | 2.32 | 2.40 | 2.46 | 2.39 |
| | | .30,.10 | 0.01, 0.01 | 2.35 | 2.19 | 2.20 | 2.17 |
| | | | 0.20, 0.05 | 2.66 | 2.52 | 2.51 | 2.49 |
| | | | 0.20, 0.20 | 3.76 | 3.66 | 3.62 | 3.60 |
| | | | 0.60, 0.01 | 2.35 | 2.19 | 2.20 | 2.17 |
| $J = 5, n_j = 50$ | Low | .20,.20 | 0.01, 0.01 | 2.61 | 2.37 | 2.38 | 2.39 |
| | | | 0.20, 0.05 | 3.77 | 3.58 | 3.58 | 3.60 |
| | | | 0.20, 0.20 | 6.98 | 6.85 | 6.83 | 6.86 |
| | | | 0.60, 0.01 | 2.61 | 2.37 | 2.38 | 2.39 |
| | | .30,.10 | 0.01, 0.01 | 2.64 | 2.29 | 2.29 | 2.30 |
| | | | 0.20, 0.05 | 3.81 | 3.53 | 3.52 | 3.54 |
| | | | 0.20, 0.20 | 7.02 | 6.82 | 6.81 | 6.82 |
| | | | 0.60, 0.01 | 5.26 | 4.56 | 4.55 | 4.56 |
| | High | .20,.20 | 0.01, 0.01 | 2.66 | 2.57 | 2.60 | 2.57 |
| | | | 0.20, 0.05 | 3.81 | 3.71 | 3.74 | 3.73 |
| | | | 0.20, 0.20 | 7.01 | 6.92 | 6.94 | 6.94 |
| | | | 0.60, 0.01 | 2.66 | 2.56 | 2.60 | 2.57 |
| | | .30,.10 | 0.01, 0.01 | 2.68 | 2.43 | 2.42 | 2.43 |
| | | | 0.20, 0.05 | 3.81 | 3.63 | 3.62 | 3.63 |
| | | | 0.20, 0.20 | 7.00 | 6.89 | 6.88 | 6.88 |
| | | | 0.60, 0.01 | 2.67 | 2.43 | 2.42 | 2.43 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | 2.31 | 2.15 | 2.20 | 2.16 |
| | | | 0.20, 0.05 | 2.83 | 2.70 | 2.73 | 2.69 |
| | | | 0.20, 0.20 | 2.83 | 2.70 | 2.73 | 2.69 |
| | | | 0.60, 0.01 | 2.30 | 2.14 | 2.19 | 2.15 |
| | | .30,.10 | 0.01, 0.01 | 2.36 | 2.01 | 2.05 | 2.02 |
| | | | 0.20, 0.05 | 2.88 | 2.59 | 2.62 | 2.60 |
| | | | 0.20, 0.20 | 4.42 | 4.25 | 4.26 | 4.24 |
| | | | 0.60, 0.01 | 2.36 | 2.01 | 2.05 | 2.02 |
| | High | .20,.20 | 0.01, 0.01 | 2.29 | 2.24 | 2.30 | 2.24 |
| | | | 0.20, 0.05 | 2.83 | 2.76 | 2.79 | 2.76 |
| | | | 0.20, 0.20 | 4.41 | 4.36 | 4.32 | 4.33 |
| | | | 0.60, 0.01 | 2.30 | 2.24 | 2.30 | 2.25 |
| | | .30,.10 | 0.01, 0.01 | 2.28 | 2.11 | 2.13 | 2.11 |
| | | | 0.20, 0.05 | 2.80 | 2.67 | 2.67 | 2.66 |
| | | | 0.20, 0.20 | 4.37 | 4.31 | 4.28 | 4.27 |
| | | | 0.60, 0.01 | 2.29 | 2.11 | 2.13 | 2.11 |

**Table A20:** RMSE for treatment estimate on $Y_2$ after each of the MI methods under comparison, for scenarios corresponding to missing data mechanisms depending on cluster-level covariates

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25, n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | 2.45 | 2.25 | 2.34 | 2.25 |
| | | | 0.20, 0.05 | 2.78 | 2.60 | 2.68 | 2.60 |
| | | | 0.20, 0.20 | 3.94 | 3.80 | 3.84 | 3.79 |
| | | | 0.60, 0.01 | 2.46 | 2.20 | 2.38 | 2.18 |
| | | .30,.10 | 0.01, 0.01 | 2.46 | 2.09 | 2.12 | 2.09 |
| | | | 0.20, 0.05 | 2.80 | 2.46 | 2.49 | 2.46 |
| | | | 0.20, 0.20 | 3.95 | 3.70 | 3.71 | 3.70 |
| | | | 0.60, 0.01 | 2.46 | 2.08 | 2.12 | 2.09 |
| | High | .20,.20 | 0.01, 0.01 | 2.47 | 2.44 | 2.71 | 2.45 |
| | | | 0.20, 0.05 | 2.79 | 2.75 | 2.98 | 2.74 |
| | | | 0.20, 0.20 | 3.96 | 3.93 | 4.04 | 3.86 |
| | | | 0.60, 0.01 | 2.47 | 2.45 | 2.70 | 2.46 |
| | | .30,.10 | 0.01, 0.01 | 2.52 | 2.22 | 2.44 | 2.22 |
| | | | 0.20, 0.05 | 2.85 | 2.58 | 2.77 | 2.57 |
| | | | 0.20, 0.20 | 2.52 | 2.22 | 2.44 | 2.22 |
| | | | 0.60, 0.01 | 2.53 | 2.22 | 2.45 | 2.23 |
| $J = 5, n_j = 50$ | Low | .20,.20 | 0.01, 0.01 | 2.75 | 2.54 | 2.56 | 2.57 |
| | | | 0.20, 0.05 | 3.92 | 3.74 | 3.76 | 3.79 |
| | | | 0.20, 0.20 | 7.15 | 7.08 | 7.08 | 7.13 |
| | | | 0.60, 0.01 | 2.76 | 2.54 | 2.56 | 2.58 |
| | | .30,.10 | 0.01, 0.01 | 2.73 | 2.42 | 2.41 | 2.43 |
| | | | 0.20, 0.05 | 3.92 | 3.68 | 3.68 | 3.70 |
| | | | 0.20, 0.20 | 7.18 | 7.06 | 7.06 | 7.09 |
| | | | 0.60, 0.01 | 2.74 | 2.42 | 2.41 | 2.43 |
| | High | .20,.20 | 0.01, 0.01 | 2.85 | 2.94 | 3.33 | 2.91 |
| | | | 0.20, 0.05 | 4.05 | 4.10 | 4.53 | 4.06 |
| | | | 0.20, 0.20 | 7.22 | 7.45 | 7.53 | 7.29 |
| | | | 0.60, 0.01 | 2.87 | 2.94 | 3.54 | 2.96 |
| | | .30,.10 | 0.01, 0.01 | 2.84 | 2.58 | 2.73 | 2.57 |
| | | | 0.20, 0.05 | 4.05 | 3.82 | 3.95 | 3.79 |
| | | | 0.20, 0.20 | 7.30 | 7.20 | 7.25 | 7.14 |
| | | | 0.60, 0.01 | 2.87 | 2.58 | 2.87 | 2.60 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | 2.36 | 2.19 | 2.28 | 2.19 |
| | | | 0.20, 0.05 | 2.92 | 2.75 | 2.83 | 2.75 |
| | | | 0.20, 0.20 | 4.58 | 4.47 | 4.49 | 4.45 |
| | | | 0.60, 0.01 | 2.36 | 2.19 | 2.27 | 2.18 |
| | | .30,.10 | 0.01, 0.01 | 2.41 | 2.05 | 2.09 | 2.06 |
| | | | 0.20, 0.05 | 2.96 | 2.66 | 2.69 | 2.66 |
| | | | 0.20, 0.20 | 4.57 | 4.40 | 4.41 | 4.38 |
| | | | 0.60, 0.01 | 2.41 | 2.05 | 2.09 | 2.06 |
| | High | .20,.20 | 0.01, 0.01 | 2.49 | 2.43 | 2.78 | 2.44 |
| | | | 0.20, 0.05 | 3.09 | 3.02 | 3.24 | 3.00 |
| | | | 0.20, 0.20 | 4.80 | 4.80 | 4.80 | 4.69 |
| | | | 0.60, 0.01 | 2.48 | 2.44 | 2.78 | 2.47 |
| | | .30,.10 | 0.01, 0.01 | 2.47 | 2.19 | 2.38 | 2.18 |
| | | | 0.20, 0.05 | 3.06 | 2.80 | 2.94 | 2.78 |
| | | | 0.20, 0.20 | 4.72 | 4.59 | 4.62 | 4.53 |
| | | | 0.60, 0.01 | 2.46 | 2.20 | 2.38 | 2.18 |

**Table A21:** RMSE for treatment estimate on $Y_2$ after each of the MI methods under comparison, for scenarios corresponding to missing data mechanisms depending on both individual and cluster-level covariates

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25, n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | 2.39 | 2.25 | 2.29 | 2.24 |
| | | | 0.20, 0.05 | 2.65 | 2.59 | 2.64 | 2.60 |
| | | | 0.20, 0.20 | 3.70 | 3.80 | 3.81 | 3.80 |
| | | | 0.60, 0.01 | 2.39 | 2.24 | 2.29 | 2.25 |
| | | .30,.10 | 0.01, 0.01 | 2.34 | 2.07 | 2.07 | 2.05 |
| | | | 0.20, 0.05 | 2.61 | 2.44 | 2.44 | 2.43 |
| | | | 0.20, 0.20 | 3.68 | 3.69 | 3.67 | 3.67 |
| | | | 0.60, 0.01 | 2.34 | 2.07 | 2.07 | 2.05 |
| | High | .20,.20 | 0.01, 0.01 | 2.42 | 2.54 | 2.68 | 2.55 |
| | | | 0.20, 0.05 | 2.63 | 2.87 | 2.96 | 2.88 |
| | | | 0.20, 0.20 | 3.62 | 4.07 | 4.04 | 4.03 |
| | | | 0.60, 0.01 | 2.43 | 2.54 | 2.68 | 2.56 |
| | | .30,.10 | 0.01, 0.01 | 2.41 | 2.33 | 2.46 | 2.34 |
| | | | 0.20, 0.05 | 2.61 | 2.68 | 2.78 | 2.68 |
| | | | 0.20, 0.20 | 3.58 | 3.89 | 3.92 | 3.83 |
| | | | 0.60, 0.01 | 2.42 | 2.33 | 2.45 | 2.35 |
| $J = 5, n_j = 50$ | Low | .20,.20 | 0.01, 0.01 | 2.66 | 2.50 | 2.52 | 2.52 |
| | | | 0.20, 0.05 | 3.59 | 3.72 | 3.73 | 3.75 |
| | | | 0.20, 0.20 | 6.62 | 7.07 | 7.06 | 7.10 |
| | | | 0.60, 0.01 | 2.66 | 2.51 | 2.52 | 2.53 |
| | | .30,.10 | 0.01, 0.01 | 2.64 | 2.40 | 2.40 | 2.39 |
| | | | 0.20, 0.05 | 3.60 | 3.68 | 3.68 | 3.67 |
| | | | 0.20, 0.20 | 6.67 | 7.07 | 7.07 | 7.07 |
| | | | 0.60, 0.01 | 2.66 | 2.40 | 2.40 | 2.38 |
| | High | .20,.20 | 0.01, 0.01 | 2.99 | 2.88 | 3.41 | 2.81 |
| | | | 0.20, 0.05 | 3.74 | 4.04 | 4.32 | 3.97 |
| | | | 0.20, 0.20 | 6.55 | 7.35 | 7.41 | 7.25 |
| | | | 0.60, 0.01 | 3.05 | 2.88 | 2.95 | 2.85 |
| | | .30,.10 | 0.01, 0.01 | 2.96 | 2.59 | 2.63 | 2.59 |
| | | | 0.20, 0.05 | 3.67 | 3.80 | 3.82 | 3.80 |
| | | | 0.20, 0.20 | 6.49 | 7.15 | 7.13 | 7.13 |
| | | | 0.60, 0.01 | 3.00 | 2.59 | 2.63 | 2.59 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | 2.34 | 2.20 | 2.26 | 2.18 |
| | | | 0.20, 0.05 | 2.78 | 2.78 | 2.81 | 2.74 |
| | | | 0.20, 0.20 | 4.33 | 4.52 | 4.48 | 4.44 |
| | | | 0.60, 0.01 | 2.35 | 2.20 | 2.25 | 2.19 |
| | | .30,.10 | 0.01, 0.01 | 2.37 | 2.08 | 2.09 | 2.09 |
| | | | 0.20, 0.05 | 2.81 | 2.68 | 2.69 | 2.69 |
| | | | 0.20, 0.20 | 4.31 | 4.42 | 4.40 | 4.40 |
| | | | 0.60, 0.01 | 2.38 | 2.08 | 2.08 | 2.09 |
| | High | .20,.20 | 0.01, 0.01 | 2.50 | 2.52 | 2.76 | 2.54 |
| | | | 0.20, 0.05 | 2.85 | 3.05 | 3.23 | 3.06 |
| | | | 0.20, 0.20 | 4.30 | 4.75 | 4.76 | 4.66 |
| | | | 0.60, 0.01 | 2.38 | 2.08 | 2.08 | 2.09 |
| | | .30,.10 | 0.01, 0.01 | 2.50 | 2.26 | 2.37 | 2.24 |
| | | | 0.20, 0.05 | 2.87 | 2.83 | 2.92 | 2.81 |
| | | | 0.20, 0.20 | 4.29 | 4.57 | 4.56 | 4.50 |
| | | | 0.60, 0.01 | 2.51 | 2.26 | 2.37 | 2.25 |

**Table A22:** RMSE for treatment estimate on $Y_2$ after each of the MI methods under comparison, for scenarios corresponding to missing data mechanisms differential by treatment arm.

| Design | $\eta$ | Prob. nonresponse | ICC | CCA | SMI | FMI | MMI |
|---|---|---|---|---|---|---|---|
| $J = 25$, $n_j = 10$ | Low | .20,.20 | 0.01, 0.01 | 6.86 | 4.37 | 4.63 | 4.39 |
| | | | 0.20, 0.05 | 9.69 | 7.14 | 7.25 | 7.16 |
| | | | 0.20, 0.20 | 9.72 | 7.14 | 7.25 | 7.16 |
| | | | 0.60, 0.01 | 16.17 | 14.77 | 14.63 | 14.64 |
| | | .30,.10 | 0.01, 0.01 | 6.64 | 4.74 | 4.96 | 4.71 |
| | | | 0.20, 0.05 | 9.48 | 7.47 | 7.49 | 7.45 |
| | | | 0.20, 0.20 | 9.49 | 7.47 | 7.49 | 7.48 |
| | | | 0.60, 0.01 | 16.06 | 15.11 | 14.77 | 14.76 |
| | High | .20,.20 | 0.01, 0.01 | 7.15 | 4.32 | 4.46 | 4.30 |
| | | | 0.20, 0.05 | 10.12 | 7.24 | 7.15 | 7.09 |
| | | | 0.20, 0.20 | 10.17 | 7.24 | 7.15 | 7.10 |
| | | | 0.60, 0.01 | 16.46 | 15.02 | 14.60 | 14.60 |
| | | .30,.10 | 0.01, 0.01 | 7.36 | 4.42 | 4.65 | 4.46 |
| | | | 0.20, 0.05 | 10.44 | 7.32 | 7.25 | 7.26 |
| | | | 0.20, 0.20 | 10.51 | 7.33 | 7.26 | 7.27 |
| | | | 0.60, 0.01 | 16.90 | 15.16 | 14.60 | 14.65 |
| $J = 5$, $n_j = 50$ | Low | .20,.20 | 0.01, 0.01 | 7.40 | 5.20 | 5.20 | 5.16 |
| | | | 0.20, 0.05 | 14.35 | 13.70 | 13.56 | 13.50 |
| | | | 0.20, 0.20 | 14.41 | 13.69 | 13.56 | 13.50 |
| | | | 0.60, 0.01 | 31.34 | 31.87 | 31.53 | 31.45 |
| | | .30,.10 | 0.01, 0.01 | 7.29 | 5.37 | 5.45 | 5.32 |
| | | | 0.20, 0.05 | 14.11 | 13.71 | 13.65 | 13.54 |
| | | | 0.20, 0.20 | 14.16 | 13.71 | 13.65 | 13.54 |
| | | | 0.60, 0.01 | 31.00 | 31.84 | 31.55 | 31.46 |
| | High | .20,.20 | 0.01, 0.01 | 7.77 | 5.07 | 5.10 | 5.05 |
| | | | 0.20, 0.05 | 14.57 | 13.62 | 13.43 | 13.42 |
| | | | 0.20, 0.20 | 14.61 | 13.62 | 13.42 | 13.44 |
| | | | 0.60, 0.01 | 31.25 | 31.87 | 31.39 | 31.37 |
| | | .30,.10 | 0.01, 0.01 | 8.19 | 5.32 | 8.96 | 5.29 |
| | | | 0.20, 0.05 | 14.86 | 13.83 | 13.61 | 13.68 |
| | | | 0.20, 0.20 | 14.93 | 13.82 | 13.67 | 13.67 |
| | | | 0.60, 0.01 | 31.36 | 32.13 | 31.51 | 31.77 |
| $J = 15$, unbalanced | Low | .20,.20 | 0.01, 0.01 | 6.59 | 4.41 | 4.55 | 4.45 |
| | | | 0.20, 0.05 | 10.49 | 8.95 | 8.88 | 8.86 |
| | | | 0.20, 0.20 | 10.54 | 8.95 | 8.87 | 8.87 |
| | | | 0.60, 0.01 | 19.87 | 19.46 | 19.15 | 19.13 |
| | | .30,.10 | 0.01, 0.01 | 6.54 | 4.77 | 5.03 | 4.82 |
| | | | 0.20, 0.05 | 10.47 | 9.27 | 9.19 | 9.11 |
| | | | 0.20, 0.20 | 10.50 | 9.27 | 9.20 | 9.13 |
| | | | 0.60, 0.01 | 19.84 | 19.87 | 19.40 | 19.23 |
| | High | .20,.20 | 0.01, 0.01 | 6.92 | 4.36 | 4.48 | 4.39 |
| | | | 0.20, 0.05 | 10.86 | 8.95 | 8.84 | 8.89 |
| | | | 0.20, 0.20 | 10.93 | 8.95 | 8.84 | 8.89 |
| | | | 0.60, 0.01 | 20.01 | 19.55 | 19.17 | 19.15 |
| | | .30,.10 | 0.01, 0.01 | 7.24 | 4.59 | 4.95 | 4.60 |
| | | | 0.20, 0.05 | 11.25 | 9.08 | 9.18 | 9.03 |
| | | | 0.20, 0.20 | 11.31 | 9.08 | 9.17 | 9.04 |
| | | | 0.60, 0.01 | 20.39 | 19.66 | 19.45 | 19.34 |