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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	η	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
			.30,.10	0.60, 0.01	-0.9	-0.8	-0.3	-0.3
	0.01, 0.01			-0.6	-0.7	-0.7	-0.5	
	0.20, 0.05			-0.5	-0.3	-0.6	-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
		High	.20,.20	0.20, 0.20	-2.9	-2.4	-2.8	-2.5
				0.60, 0.01	-0.9	0.7	-0.3	-0.1
				0.01, 0.01	-0.5	-0.6	-0.9	-1.0
			.30,.10	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	
$J = 15, \text{unbalanced}$	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	
	High	.20,.20	0.20, 0.20	-0.1	-0.8	-0.7	-0.7	
			0.60, 0.01	-1.9	-2.4	-2.4	-2.4	
			0.01, 0.01	0.4	-0.2	-0.1	-0.2	
		.30,.10	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	
		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	η	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	
$J = 15, \text{unbalanced}$	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	η	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	
$J = 15, \text{unbalanced}$	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	η	Prob. Miss	ICC	CCA		SMI		FMI		MMI	
				CR	AW	CR	AW	CR	AW	CR	AW
$J = 25,$ $n_j = 10$	Low	.20,.20	0.01, 0.01	95.1	18.4	94.5	16.7	97.8	19.7	95.3	16.9
			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
$J = 5,$ $n_j = 50$	Low	.20,.20	0.01, 0.01	93.9	20.3	93.0	18.1	96.0	20.9	92.8	18.5
			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
$J = 15,$ unbalanced	Low	.20,.20	0.01, 0.01	94.5	17.5	93.4	15.8	97.2	18.9	93.2	16.0
			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	η	Prob. Miss	ICC	CCA		SMI		FMI		MMI	
				CR	AW	CR	AW	CR	AW	CR	AW
$J = 25$ $n_j = 10$	Low	.20,.20	0.01, 0.01	93.9	19.3	95.4	18.0	98.0	23.5	95.5	18.0
			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
$J = 5$ $n_j = 50$	Low	.20,.20	0.01, 0.01	94.4	21.2	95.3	20.5	97.5	23.6	96.2	20.8
			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
$J = 15$ unbalanced	Low	.20,.20	0.01, 0.01	93.6	18.3	95.1	17.4	97.9	22.4	95.2	17.4
			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	η	Prob. Miss	ICC	CCA		SMI		FMI		MMI	
				CR	AW	CR	AW	CR	AW	CR	AW
$J = 25,$ $n_j = 50$	Low	.20,.20	0.01, 0.01	95.2	18.8	95.1	17.7	98.7	22.1	95.2	17.6
			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
$J = 5$ $n_j = 50$	Low	.20,.20	0.01, 0.01	94.3	20.5	95.4	20.2	97.0	22.4	95.1	20.3
			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
$J = 15,$ unbalanced	Low	.20,.20	0.01, 0.01	93.6	17.9	95.6	17.0	98.1	21.0	94.8	16.9
			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	η	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	
$J = 15, \text{unbalanced}$		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	η	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
$J = 15, \text{unbalanced}$	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	η	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		
		$J = 15, \text{unbalanced}$	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	η	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		
		$J = 15, \text{unbalanced}$	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	η	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
$J = 15, \text{unbalanced}$	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	η	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
$J = 15, \text{unbalanced}$	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	η	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
$J = 15, \text{unbalanced}$	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	η	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
$J = 15, \text{unbalanced}$	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	η	Prob. Miss	ICC	CCA		SMI		FMI		MMI	
				CR	AW	CR	AW	CR	AW	CR	AW
$J = 25,$ $n_j = 10$	Low	.20,.20	0.01, 0.01	94.4	9.4	94.8	8.5	97.3	10.1	95.8	8.7
			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
$J = 5,$ $n_j = 50$	Low	.20,.20	0.01, 0.01	94.9	10.5	95.1	9.4	97.1	10.8	95.7	9.8
			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
$J = 15,$ unbalanced	Low	.20,.20	0.01, 0.01	95.0	9.0	92.7	8.1	96.8	9.7	93.6	8.3
			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	η	Prob. Miss	ICC	CCA		SMI		FMI		MMI	
				CR	AW	CR	AW	CR	AW	CR	AW
$J = 25,$ $n_j = 10$	Low	.20,.20	0.01, 0.01	95.6	9.7	95.3	9.1	99.2	11.8	95.2	9.2
			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
$J = 5,$ $n_j = 50$	Low	.20,.20	0.01, 0.01	94.5	10.9	95.5	10.5	97.4	12.1	95.6	10.9
			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
$J = 15,$ unbalanced	Low	.20,.20	0.01, 0.01	94.1	9.2	95.1	8.8	98.4	11.2	95.3	8.9
			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	η	Prob. Miss	ICC	CCA		SMI		FMI		MMI	
				CR	AW	CR	AW	CR	AW	CR	AW
$J = 25,$ $n_j = 10$	Low	.20,.20	0.01, 0.01	95.2	9.6	95.4	9.0	98.8	11.2	95.3	9.1
			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
$J = 5,$ $n_j = 50$	Low	.20,.20	0.01, 0.01	95.2	10.7	95.5	10.4	97.3	11.7	96.0	10.7
			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
$J = 15,$ unbalanced	Low	.20,.20	0.01, 0.01	94.2	9.1	94.6	8.6	97.6	10.6	95.1	8.8
			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	η	Prob. Miss	ICC	CCA		SMI		FMI		MMI	
				CR	AW	CR	AW	CR	AW	CR	AW
$J = 25,$ $n_j = 10$	Low	.20,.20	0.01, 0.01	81.2	18.6	95.5	17.9	98.8	22.3	94.9	17.5
			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
$J = 5,$ $n_j = 50$	Low	.20,.20	0.01, 0.01	82.0	20.3	94.8	20.2	96.5	22.6	95.6	20.2
			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
$J = 15,$ unbalanced	Low	.20,.20	0.01, 0.01	81.0	17.7	93.9	17.0	97.4	21.0	93.2	16.9
			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	η	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
			.30,.10	0.60, 0.01	2.32	2.40	2.46	2.39
	0.01, 0.01			2.35	2.19	2.20	2.17	
	0.20, 0.05			2.66	2.52	2.51	2.49	
	$J = 5, n_j = 50$	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
		High	.20,.20	0.20, 0.20	7.02	6.82	6.81	6.82
				0.60, 0.01	5.26	4.56	4.55	4.56
				0.01, 0.01	2.66	2.57	2.60	2.57
			.30,.10	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	
$J = 15, \text{unbalanced}$	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	
	High	.20,.20	0.20, 0.20	4.42	4.25	4.26	4.24	
			0.60, 0.01	2.36	2.01	2.05	2.02	
			0.01, 0.01	2.29	2.24	2.30	2.24	
		.30,.10	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	
		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	η	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		
		$J = 15, \text{unbalanced}$	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	η	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
$J = 15, \text{unbalanced}$	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	η	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		
		$J = 15, \text{unbalanced}$	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		