Targeted maximum likelihood estimation of causal effects with interference:

a simulation study

Supplementary Materials

Appendix A: Validation simulations and demonstration of double robustness

We conducted validation simulation studies for the implementation of network-TMLE. The validation simulations demonstrate our implementation producing expected results where TMLE for dependent data has been previously shown or in simple extensions.

The network for these simulations was a static network of n nodes with a uniform degree distribution with a maximum degree of two. Throughout, let $\mathcal{G}$ indicate an n by n adjacency matrix for the network and $\mathcal{G}_{ij} = 1$ indicate whether an edge exists between individual i and j. Furthermore, $\mathcal{G}_{ii} = 0$ if no edge exists. Our simulations focus on the conditional sample mean, so both the network and distribution of baseline covariates were held constant. Simulations were conducted for sample sizes of 500 and 1000. Distributions of A and Y were generated 2000 times and network-TMLE was estimated within each simulated data set. We compared the four different possibilities of model specification:m and π correctly specified, only m correctly specified, only π correctly specified, and both m and π incorrect. Policies consisted of setting all individuals in the population to a single probability of A (i.e., $\Pr(A_i = 1|W_i, W_i^s) = p$).

As a starting point, we re-created the simulations results reported in Sofrygin and van der Laan (2017) [1]. The data generating mechanism from Sofrygin and van der Laan (2017) was

$$\Pr(W_i = 1) = 0.35$$

$$\Pr(A_i = 1|W_i, W_i^s) = \text{expit}\left(-1.2 + 1.5W_i + 0.6\sum_{j=1}^{n} W_j\mathcal{G}_{ij}\right)$$

$$\Pr(Y_i = 1|A_i, A_i^s, W_i, W_i^s) = \text{expit}\left(-2.5 + 1.5W_i + 0.5A_i + 1.5\sum_{j=1}^{n} W_j\mathcal{G}_{ij} + 1.5\sum_{j=1}^{n} A_j\mathcal{G}_{ij}\right)$$

As expected, if either the treatment model or the outcome model was correctly specified, then point estimates were unbiased across policies for both $n = 500$ and $n = 1000$ (Figure A.1). Confidence interval (CI) coverage was near nominal levels when at least one model was correct. Our validation results are consistent with the simulations in the original publication (Figures 1 and 2 in Sofrygin and van der Laan (2017)).

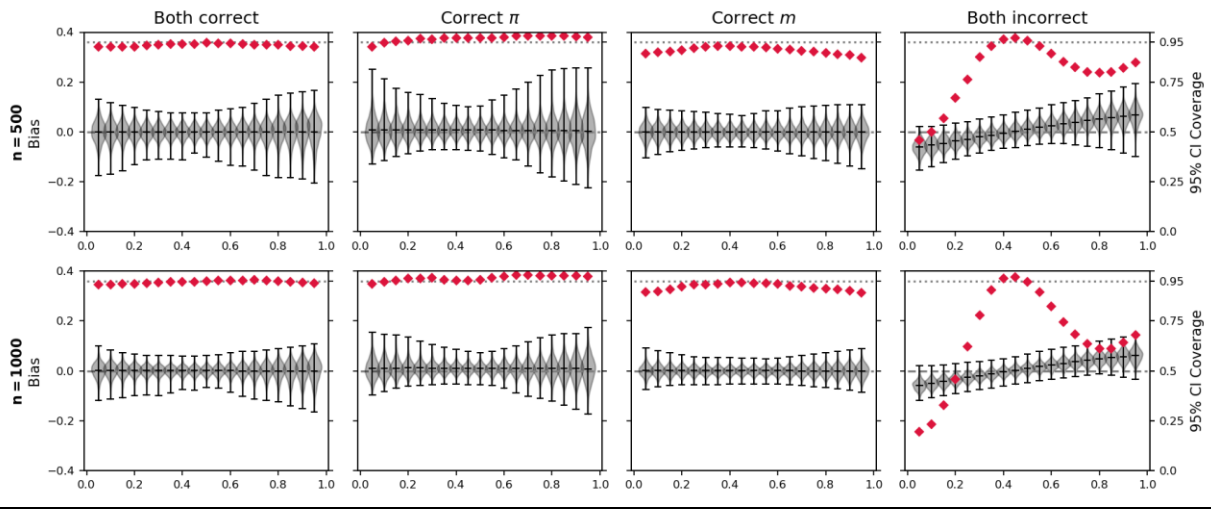

Figure A.1: Simulation results for original Sofrygin and van der Laan 2017 data generating mechanism. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and red diamonds correspond to 95% confidence interval (CI) coverage. Columns refer to which of the nuisance models (π is the treatment and m is the outcome) are correctly specified.

We then modified the Sofrygin and van der Laan data generating mechanism to only consist of a unit-treatment effect

$$\Pr(W_i = 1) = 0.35$$

$$\Pr(A_i = 1 | W_i, W_i^s) = \text{expit}\left(-0.6 - 0.9W_i + 0.8\sum_{j=1}^{n} W_j \mathcal{G}_{ij}\right)$$

$$\Pr(Y_i = 1 | A_i, W_i, W_i^s) = \text{expit}\left(-1.75 + 1.5W_i + 1.75A_i + 1.5\sum_{j=1}^{n} W_j \mathcal{G}_{ij}\right)$$

As before, point estimates had little bias if either the treatment model or the outcome model was correctly specified (Figure A.2). Additionally, CI coverage was near nominal levels when at least one model was correct.

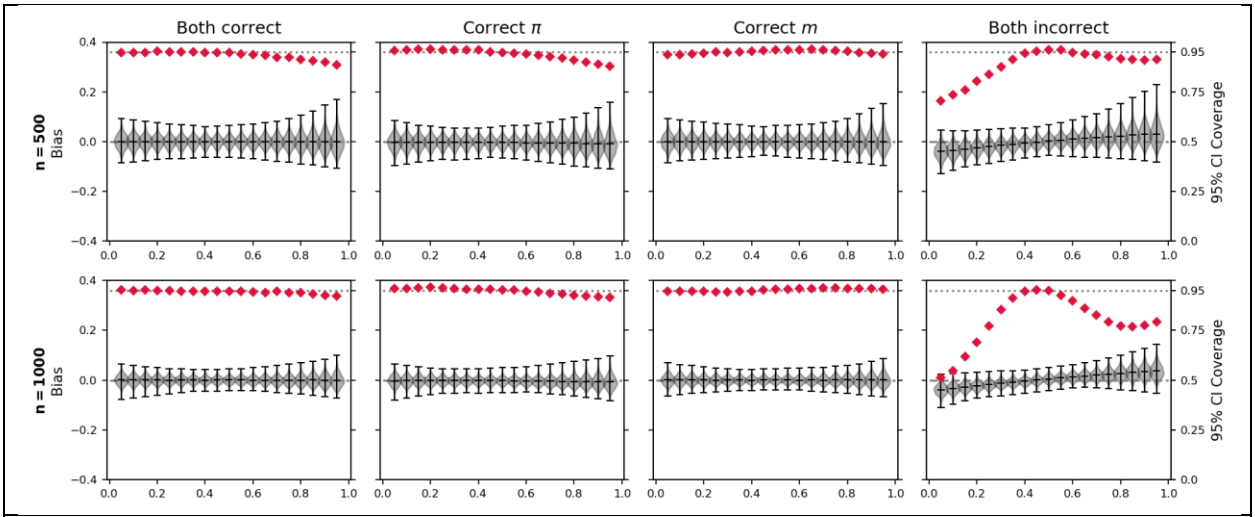

Figure A.2: Simulation results for a unit-treatment effect only data generating mechanism. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and red diamonds correspond to 95% confidence interval (CI) coverage. Columns refer to which of the nuisance models (π is the treatment and m is the outcome) are correctly specified.

Next, we designed a scenario with only a spillover (indirect) effect.

$$\Pr(W_i = 1) = 0.35$$

$$\Pr(A_i = 1 | W_i, W_i^s) = \text{expit}\left(-0.6 - 0.9W_i + 0.8\sum_{j=1}^{n} W_j \mathcal{G}_{ij}\right)$$

$$\Pr(Y_i = 1 | A_i^s, W_i, W_i^s) = \text{expit}\left(-1.75 + 1.5W_i + 1.5\sum_{j=1}^{n} W_j \mathcal{G}_{ij} - 1.5\sum_{j=1}^{n} A_j \mathcal{G}_{ij}\right)$$

Point estimates had little bias if either the treatment model or the outcome model was correctly specified (Figure A.3). CI coverage was near nominal levels when at least one model was correct.

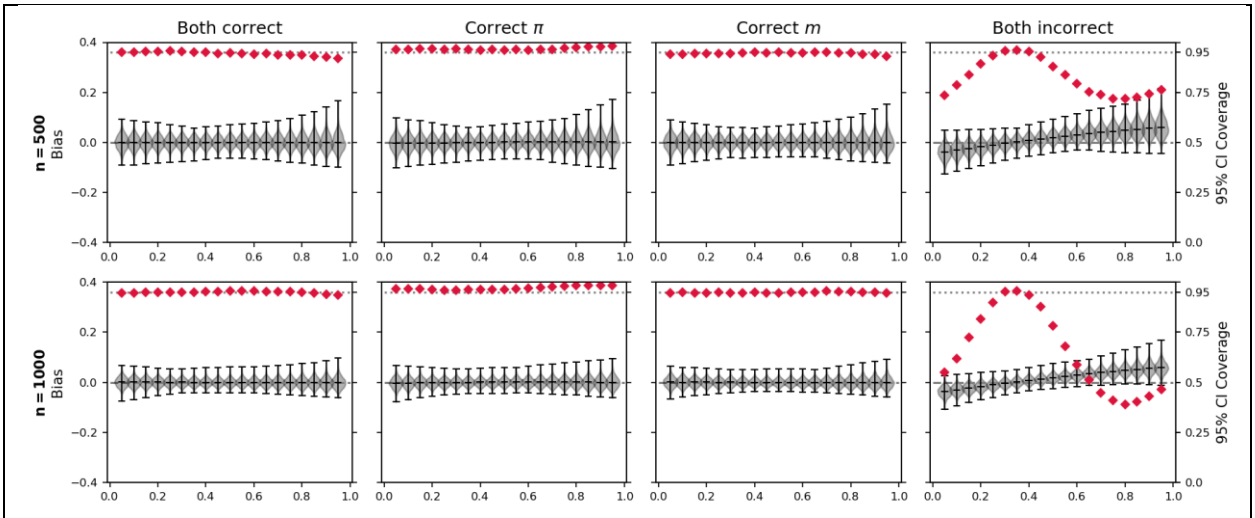

Figure A.3: Simulation results for spillover effect only data generating mechanism. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and red diamonds correspond to 95% confidence interval (CI) coverage. Columns refer to which of the nuisance models (π is the treatment and m is the outcome) are correctly specified.

Lastly, we created a modification that included a continuous Y

$$\Pr(W_i = 1) = 0.35$$

$$\Pr(A_i = 1 | W_i, W_i^S) = \text{expit}\left(-1.2 + 1.5W_i + 0.4\sum_{j=1}^{n} W_j \mathcal{G}_{ij}\right)$$

$$E[Y_i] = 20 - 5W_i + 5A_i + 1.5\sum_{j=1}^{n} W_j \mathcal{G}_{ij} + 1.5\sum_{j=1}^{n} A_j \mathcal{G}_{ij} + \epsilon_i$$

where $\epsilon_i \sim \text{Normal}(0,1)$

Point estimates had little bias if either the treatment model or the outcome model was correctly specified (Figure A.4). CI coverage was near nominal levels when at least one model was correct. Bias and poor confidence limit coverage when both models are misspecified is more apparent compared to previous examples.

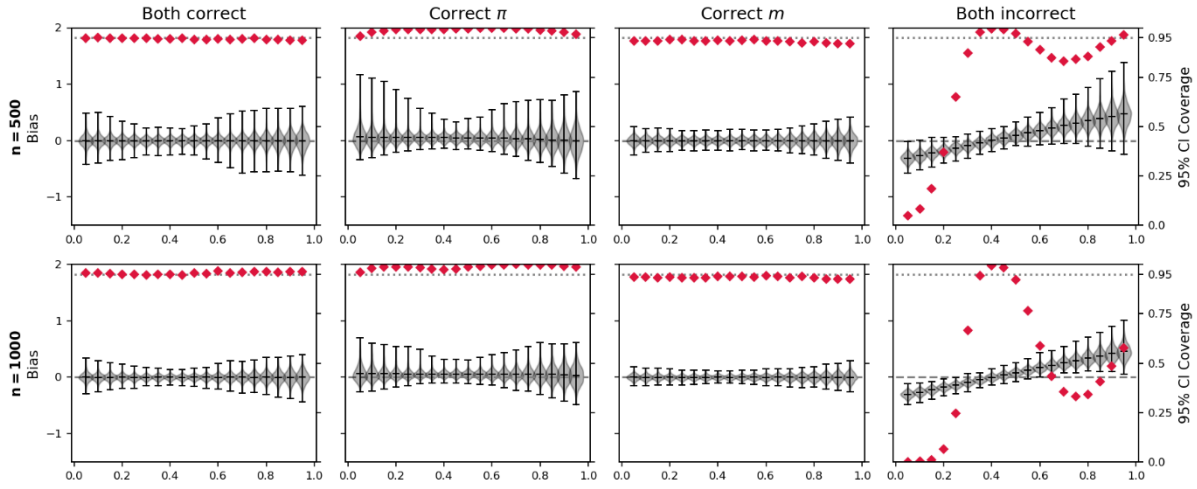

Figure A.4: Simulation results for continuous outcome data generating mechanism. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and red diamonds correspond to 95% confidence interval (CI) coverage. Columns refer to which of the nuisance models (π is the treatment and m is the outcome) are correctly specified.

Appendix B: Simulated Data Generation

Table B.1: Descriptive characteristics of networks used for simulations

	Uniform (n=500)	Uniform (n=1000)	Clustered Power-Law (n=500)	Clustered Power-Law (n=1000)	eX-FLU*
Nodes	500	1000	500	1000	467
Edges	893	1791	1506	3173	1818
Density	0.007	0.004	0.012	0.006	0.017
Diameter	11	12	8	8	14
Radius	7	8	6	6	7
Average shortest path	5.1	5.7	4.5	4.7	4.9
Degree (SD)	3.6 (1.61)	3.6 (1.68)	6.0 (4.57)	6.3 (4.7)	7.8 (7.06)
Degree assortativity	0.00	0.00	-0.14	-0.13	0.47
Cluster coefficient (SD)	0.0 (0.05)	0.0 (0.01)	0.4 (0.23)	0.4 (0.23)	0.5 (0.32)

SD: standard deviation. Density: number of actual edges relative to the maximum number of potential edges for the entire network, Diameter: maximum eccentricity (greatest distance between one node to any other node in the network), Radius: minimum eccentricity, Average Shortest Path: average of the all shortest paths between all node pairs, Degree: number of edges an individual has, Degree assortativity: connections to other nodes with a similar degree, Clustering coefficient: measure of extent to which node's neighbors connect to each other

* The eX-FLU network comes from the eX-FLU study, a cluster randomized trial assessing the efficacy of three-day self-isolation on mitigating spread of respiratory illness among university students.[2]

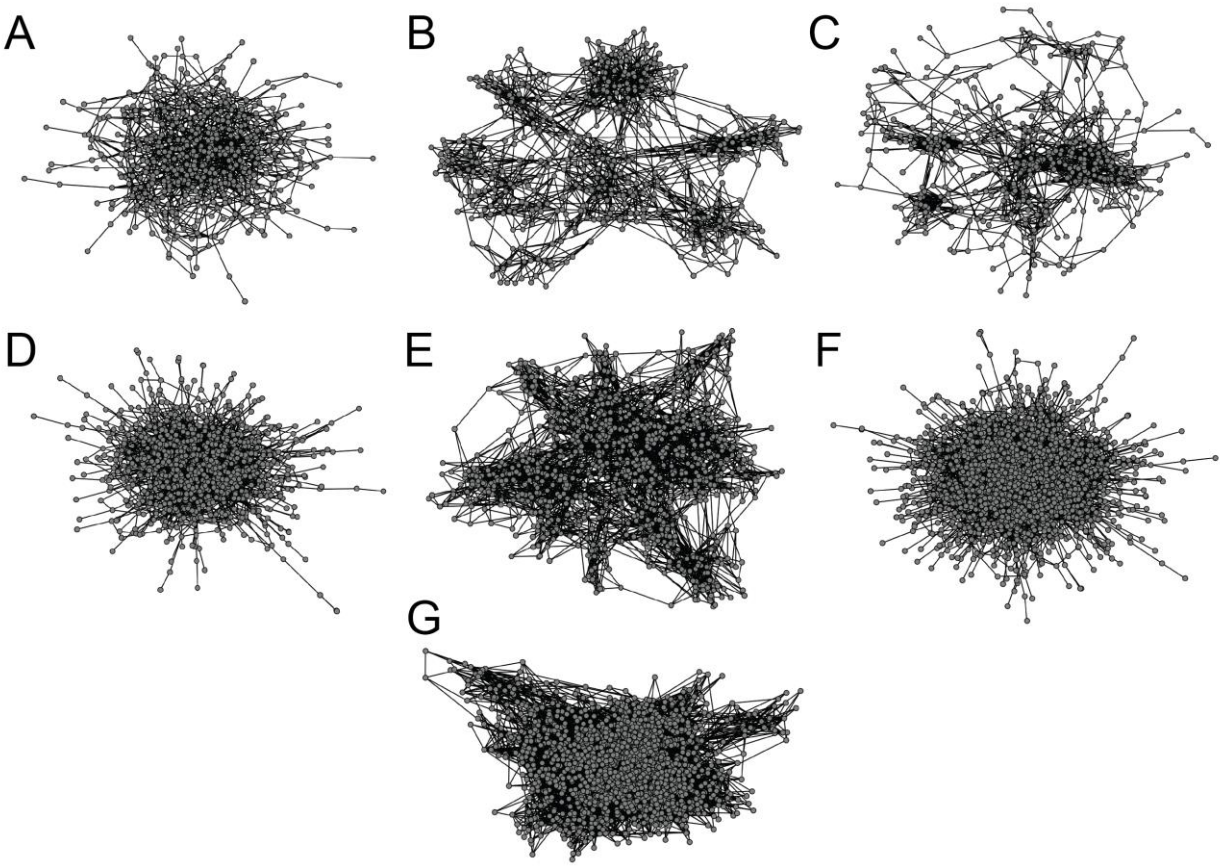

Figure B.1: Visualizations of networks used in simulations. A: uniform random network ($n = 500$), B: clustered power-law random network ($n = 500$), C: eX-FLU observed network, D: uniform random network ($n = 1000$), E: clustered power-law random network ($n = 1000$), F: uniform random network ($n = 2000$), G: clustered power-law random network ($n = 2000$).

Let F_i indicate the degree, or the number of unique contacts $\sum_{j=1}^{n} \mathcal{G}_{ij}$ throughout.

Statin and Cardiovascular Disease

Let X_i indicate age, L_i indicate log-transformed low-density lipoprotein, U_i^1 indicate diabetes, U_i^2 indicate frailty, R_i indicate the calculated risk score for cardiovascular disease, and $W_i = (X_i, L_i, R_i)$. These variables were generated from the following distributions.

$$X_i = \text{Uniform}(40, 60)$$

$$L_i = 0.005X_i + \text{Normal}(\log(100), 0.18)$$

$$\Pr\left(U_i^1 = 1 | L_i, X_i\right) = \text{expit}(-4.23 + 0.03L_i - 0.02X_i + 0.0009X_iX_i)$$

$$U_i^2 = \text{expit}\left(-5.5 + 0.05(X_i - 20) + 0.001X_iX_i + \text{Normal}(0,1)\right)$$

$$R_i = \text{expit}\left(4.299 + 3.501U_i^1 - 2.07\log(X_i) + 0.051\log(X_i)^2 + 4.090L_i - 1.04\log(X_i)\,L_i + 0.01U_i^2\right)$$

These variables were generated once for each individual in each network and held constant across simulations. Statin prescription (indicated by A_i) was generated following

$$\begin{aligned}\text{logit}(\Pr(A_i = 1|W_i)) = -5.3 + 0.2\,L_i + 0.15(X_i - 30) + 0.4\,I(0.05 \le R_i < 0.075)\\ +0.9\,I(0.075 \le R_i < 0.2) + 1.5\,I(R_i \ge 0.2)\end{aligned}$$

Cardiovascular disease (indicated by Y_i) was generated following

$$\Pr(Y_i = 1|A_i, W_i) = \text{expit}\big(-5.05 - 0.8\,A_i + 0.37\,\sqrt{X_i - 39.9} + 0.75\,R_i + 0.75\,L_i\big)$$

The correctly specified models were

$$\begin{aligned}\text{logit}(\Pr(A_i = 1|W_i)) = \beta_0 + \beta_1\,L_i + \beta_2(X_i - 30) + \beta_3\,I(0.05 \le R_i < 0.075)\\ +\beta_4\,I(0.075 \le R_i < 0.2) + \beta_5\,I(R_i \ge 0.2)\end{aligned}$$

$$\begin{aligned}\log(E[A_i^s|A_i, W_i]) = \beta_0 + \beta_1 A_i + \beta_2\,L_i + \beta_3(X_i - 30) + \beta_4\,I(0.05 \le R_i < 0.075)\\ +\beta_5\,I(0.075 \le R_i < 0.2) + \beta_6\,I(R_i \ge 0.2)\end{aligned}$$

$$\Pr(Y_i = 1|A_i, W_i) = \text{expit}\left(\beta_0 + \beta_1\,A_i + \beta_2\sum_{j=1}^{n} I\big(A_j = 1\big)\mathcal{G}_{ij} + \beta_3\,\sqrt{X_i - 39.9} + \beta_4\,R_i + \beta_5\,L_i\right)$$

The exposure models were misspecified as

$$\text{logit}(\Pr(A_i = 1|W_i)) = \beta_0 + \beta_1\,L_i + \beta_2 R_i$$

$$\log(E[A_i^s|A_i, W_i]) = \beta_0 + \beta_1 A_i + \beta_2\,L_i + \beta_3\,R_i$$

The outcome model was misspecified as

$$\Pr(Y_i = 1|A_i, W_i) = \text{expit}\left(\beta_0 + \beta_1\,A_i + \beta_2\sum_{j=1}^{n} I\big(A_j = 1\big)\mathcal{G}_{ij} + \beta_3 R_i^2 + \beta_4 L_i\right)$$

The flexible exposure and outcome models were based on the correctly specified models but added additional parameters for the covariates of contacts. To summarize X and L values of contacts, $\beta\frac{\sum_{j=1}^{n}\mathcal{G}_{ij}(X_j - X_i)}{\sum_{j=1}^{n}\mathcal{G}_{ij}}$ and $\beta\frac{\sum_{j=1}^{n}\mathcal{G}_{ij}(L_j - L_i)}{\sum_{j=1}^{n}\mathcal{G}_{ij}}$ were added to the model, respectively. To summarize R of immediate contacts, the following dummy variables were created: $R_i^{cs1} = g_1\big(R_i^{s1}\big)$, $R_i^{cs2} = g_2\big(R_i^{s2}\big)$, and $R_i^{cs3} = g_3\big(R_i^{s3}\big)$; where $R_i^{s1} = \sum_{j=1}^{n}\mathcal{G}_{ij}\,I\big(0.05 \le R_j < 0.075\big)$, $R_i^{s2} = \sum_{j=1}^{n}\mathcal{G}_{ij}\,I\big(0.075 \le R_j < 0.2\big)$, and $R_i^{s3} = \sum_{j=1}^{n}\mathcal{G}_{ij}\,I\big(0.2 \le R_j\big)$. Here, $g.(\cdot)$ indicates the grouping used for the corresponding terms from the generalization of histograms. The corresponding functions are provided below:

	Uniform (n=500)	Clustered Power-Law (n=500)	eX-FLU
$g_1(R_i^{s1})$	0 if $0 \le R_i^{s1} < 1$ 1 if $1 \le R_i^{s1} \le 6$	0 if $0 \le R_i^{s1} < 1$ 1 if $1 \le R_i^{s1} < 2$ 2 if $2 \le R_i^{s1} \le 16$	0 if $0 \le R_i^{s1} < 1$ 1 if $1 \le R_i^{s1} < 2$ 2 if $2 \le R_i^{s1} \le 16$
$g_2(R_i^{s2})$	0 if $0 \le R_i^{s2} < 1$ 1 if $1 \le R_i^{s2} \le 6$	0 if $0 \le R_i^{s2} < 1$ 1 if $1 \le R_i^{s2} < 2$ 2 if $2 \le R_i^{s2} \le 16$	0 if $0 \le R_i^{s2} < 1$ 1 if $1 \le R_i^{s2} < 2$ 2 if $2 \le R_i^{s2} \le 16$
$g_3(R_i^{s3})$	NA	0 if $0 \le R_i^{s3} < 1$ 1 if $1 \le R_i^{s3} \le 16$	0 if $0 \le R_i^{s3} < 1$ 1 if $1 \le R_i^{s3} \le 16$

	Uniform (n=1000)	Clustered Power-Law (n=1000)
$g_1(R_i^{s1})$	0 if $0 \le R_i^{s1} < 1$ 1 if $1 \le R_i^{s1} < 2$ 2 if $2 \le R_i^{s1} \le 6$	0 if $0 \le R_i^{s1} < 1$ 1 if $1 \le R_i^{s1} < 2$ 2 if $2 \le R_i^{s1} < 3$ 3 if $3 \le R_i^{s1} \le 25$
$g_2(R_i^{s2})$	0 if $0 \le R_i^{s2} < 1$ 1 if $1 \le R_i^{s2} < 2$ 2 if $2 \le R_i^{s2} < 3$ 3 if $3 \le R_i^{s2} \le 6$	0 if $0 \le R_i^{s2} < 1$ 1 if $1 \le R_i^{s2} < 2$ 2 if $2 \le R_i^{s2} < 3$ 3 if $3 \le R_i^{s2} < 6$ 4 if $6 \le R_i^{s2} \le 25$
$g_3(R_i^{s3})$	0 if $0 \le R_i^{s1} < 1$ 1 if $1 \le R_i^{s1} \le 3$	0 if $0 \le R_i^{s3} < 1$ 1 if $1 \le R_i^{s3} < 2$ 2 if $2 \le R_i^{s3} \le 25$

	Uniform (n=2000)	Clustered Power-Law (n=2000)
$g_1(R_i^{s1})$	0 if $0 \le R_i^{s1} < 1$ 1 if $1 \le R_i^{s1} < 2$ 2 if $2 \le R_i^{s1} < 3$ 3 if $3 \le R_i^{s1} \le 6$	0 if $0 \le R_i^{s1} < 1$ 1 if $1 \le R_i^{s1} < 2$ 2 if $2 \le R_i^{s1} < 3$ 3 if $3 \le R_i^{s1} \le 25$
$g_2(R_i^{s2})$	0 if $0 \le R_i^{s2} < 1$ 1 if $1 \le R_i^{s2} < 2$ 2 if $2 \le R_i^{s2} < 3$ 3 if $3 \le R_i^{s1} < 4$ 4 if $4 \le R_i^{s2} \le 6$	0 if $0 \le R_i^{s2} < 1$ 1 if $1 \le R_i^{s2} < 2$ 2 if $2 \le R_i^{s2} < 3$ 3 if $3 \le R_i^{s2} < 4$ 4 if $4 \le R_i^{s2} < 6$ 5 if $6 \le R_i^{s2} \le 25$
$g_3(R_i^{s3})$	0 if $0 \le R_i^{s1} < 1$ 1 if $1 \le R_i^{s1} < 3$ 2 if $3 \le R_i^{s1} \le 6$	0 if $0 \le R_i^{s3} < 1$ 1 if $1 \le R_i^{s3} < 2$ 2 if $2 \le R_i^{s3} \le 25$

Naloxone and Opioid Overdose Deaths

Let S_i indicate gender, O_i recent overdose before study baseline, P_i indicate recent release from prison, and $W_i = (S_i, O_i, P_i, F_i)$. These variables were generated from the following distributions.

$$\Pr(S_i = 1) = 0.325$$

$$\text{logit}(\Pr(P_i = 1|S_i^s)) = -1.1 + 0.5S_i + 0.1\frac{\sum_{j=1}^{n} S_j \mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}}$$

$$\text{logit}(\Pr(O_i = 1|S_i, P_i, S_i^s)) = -1.7 + 0.1S_i + 0.1\frac{\sum_{j=1}^{n} S_j \mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}} + 0.6P_i$$

These variables were generated once for each individual in each network and held constant across simulations. Naloxone training and access (indicated by A_i) was generated following

$$\text{logit}(\Pr(A_i = 1|W_i, W_i^s)) = -0.5 - 1.5\,P_i + 1.5\,P_iS_i + 0.3\sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} + 0.95\frac{\sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}} + 0.05F_i$$

Probability of opioid overdose was generated following

$$\text{logit}(\Pr(Y_i = 1|A_i^s, W_i, W_i^s)) = -0.4 - 0.2\sum_{j=1}^{n} I(A_j = 1)\mathcal{G}_{ij} + 1.7\,P_i - 1.1\,S_i + 0.6\sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} - 1.5\frac{\sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}} - 0.4F_i$$

The correctly specified models were

$$\text{logit}(\Pr(A_i = 1|W_i, W_i^s)) = \beta_0 + \beta_1\,P_i + \beta_2\,P_iS_i + \beta_3\sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} + \beta_4\frac{\sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}} + \beta_5F_i$$

$$\log(E[A_i^s|A_i, W_i, W_i^s]) = \beta_0 + \beta_1A_i + \beta_2\,P_i + \beta_3P_iS_i + \beta_4\sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} + \beta_5\frac{\sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}} + \beta_6F_i$$

$$\text{logit}(\Pr(Y_i = 1|A_i, W_i, W_i^s)) = \beta_0 + \beta_1\sum_{j=1}^{n} I(A_j = 1)\mathcal{G}_{ij} + \beta_2\,P_i + \beta_3\,S_i + \beta_4\sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} + \beta_5\frac{\sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}} + \beta_6F_i$$

The exposure models were misspecified as

$$\text{logit}(\Pr(A_i = 1|W_i, W_i^s)) = \beta_0 + \beta_1 P_i + \beta_2 P_i S_i + \beta_3 I\left(3 < \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij}\right) + \beta_4 F_i$$

$$\log(E[A_i^s|A_i, W_i, W_i^s]) = \beta_0 + \beta_1 A_i + \beta_2 P_i + \beta_3 P_i S_i + \beta_4 I\left(3 < \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij}\right) + \beta_5 F_i$$

The outcome model was misspecified as

$$\text{logit}(\Pr(Y_i = 1|A_i^s, W_i, W_i^s)) = \beta_0 + \beta_1 \sum_{j=1}^{n} I(A_j = 1)\mathcal{G}_{ij} + \beta_2 P_i + \beta_3 S_i + \beta_5 I\left(3 < \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij}\right) + \beta_6 F_i$$

The flexible exposure and outcome models modified the correctly specified models by replacing $\sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij}$ with O_i^{cs} as a dummy variable, replacing $\frac{\sum_{j=1}^{n} I(S_j=1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}}$ with S_i^{cs} as a dummy variable, and added the additional dummy variable P_i^{cs}. Values for the dummy variables are provided below

	Uniform (n=500)	**Clustered Power-Law (n=500)**	**eX-FLU**
S^{cs}	0 if $0 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ 1 if $1 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ 2 if $2 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \leq 6$	0 if $0 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ 1 if $1 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ 2 if $2 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 4$ 3 if $4 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 8$ 4 if $8 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \leq 13$	0 if $0 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ 1 if $1 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ 2 if $2 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 6$ 3 if $6 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \leq 15$

O^{sc}	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} \le 6$	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 3$ $2 \text{ if } 3 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 7$ $3 \text{ if } 7 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 13$ $4 \text{ if } 13 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} \le 20$	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 6$ $3 \text{ if } 6 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} \le 15$
P^{sc}	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} \le 6$	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 4$ $3 \text{ if } 4 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 8$ $4 \text{ if } 8 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} \le 14$	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 6$ $3 \text{ if } 6 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} \le 15$

	Uniform (n=1000)	**Clustered Power-Law (n=1000)**
S^{cs}	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \le 6$	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 5$ $4 \text{ if } 5 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \le 19$

O^{sc}	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} \le 6$	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \le \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} \le 11$
P^{sc}	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} \le 6$	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 5$ $4 \text{ if } 5 \le \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} \le 19$

	Uniform (n=2000)	**Clustered Power-Law (n=2000)**
S^{cs}	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 4$ $4 \text{ if } 4 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \le 6$	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 5$ $4 \text{ if } 5 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 8$ $5 \text{ if } 8 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \le 25$

O^{sc}	$0 \text{ if } 0 \leq \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \leq \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \leq \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \leq \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} \leq 6$	$0 \text{ if } 0 \leq \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \leq \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \leq \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \leq \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} < 5$ $4 \text{ if } 5 \leq \sum_{j=1}^{n} I(O_j = 1)\mathcal{G}_{ij} \leq 15$
P^{sc}	$0 \text{ if } 0 \leq \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \leq \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \leq \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \leq \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 4$ $4 \text{ if } 4 \leq \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} \leq 6$	$0 \text{ if } 0 \leq \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \leq \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \leq \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \leq \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 6$ $4 \text{ if } 6 \leq \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} < 9$ $5 \text{ if } 9 \leq \sum_{j=1}^{n} I(P_j = 1)\mathcal{G}_{ij} \leq 19$

Comprehensive Dietary Intervention and Body Mass Index

Let S_i indicate gender, B_i indicate body mass index (BMI) at baseline, E_i indicate recent exercise at baseline, U_i indicate proximity to work, and $W_i = (S_i, B_i, E_i, F_i)$. These variables were generated from the following distributions.

$$\Pr(U_i) = 0.5$$

$$\Pr(S_i = 1) = 0.4 + 0.5U_i I\left(0.5 < \frac{\sum_{j=1}^{n} I(U_j = 1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}}\right)$$

$$B_i = \text{LogNormal}\left(3.35 + 0.25U_i I\left(0.5 < \frac{\sum_{j=1}^{n} I(U_j = 1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}}\right), 0.2\right)$$

$$\text{logit}(\Pr(E_i = 1)) = -0.1 + 0.3S_i - 0.0515B_i + 0.001B_i^2$$

These variables were generated once for each individual in each network and held constant across simulations. Comprehensive dietary reform including caloric restriction and increased food quality (indicated by A_i) was generated following

$$\text{logit}(\Pr(A_i = 1|W_i, W_i^s)) = -1.5 + 0.05(B_i - 30) + 2.0S_iE_i + 1.0\frac{\sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}} + 1.0\frac{\sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}} + 0.05F_i$$

BMI at end of the follow-up period depended on the following model

$$Y_i = 3.9 + B_i - 3A_i - 2\,I\left(3 < \sum_{j=1}^{n} I(A_j = 1)\mathcal{G}_{ij}\right) - 2U_i + 2S_i - 2E_i - 1.0\sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} - 0.75\sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} + \frac{\sum_{j=1}^{n} \mathcal{G}_{ij}(B_j - B_i)}{\sum_{j=1}^{n} \mathcal{G}_{ij}} + 0.2F_i + 3\,I\left(0.4 < \frac{\sum_{j=1}^{n} I(U_j = 1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}}\right) + \epsilon_i$$

where $\epsilon_i \sim \text{Normal}(0,1)$. The correctly specified models were

$$\text{logit}(\Pr(A_i = 1|W_i, W_i^s)) = \beta_0 + \beta_1(B_i - 30) + \beta_2 S_iE_i + \beta_3\frac{\sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}} + \beta_4\sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} + \beta_5 F_i$$

$$\text{logit}(\Pr(A_i^s > 3|A_i, W_i, W_i^s)) = \beta_0 + \beta_1 A_i + \beta_2(B_i - 30) + \beta_3 S_iE_i + \beta_4\frac{\sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}} + \beta_5\sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} + \beta_6 F_i$$

$$E[Y|A_i, A_i^s, W_i, W_i^s] = \beta_0 + \beta_1 B_i + \beta_2 A_i + \beta_3 I\left(3 < \sum_{j=1}^{n} I(A_j = 1)\mathcal{G}_{ij}\right) + \beta_4 S_i + \beta_5 E_i$$
$$+\beta_6 \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} + \beta_7 \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} + \beta_8 \frac{\sum_{j=1}^{n} \mathcal{G}_{ij}(B_j - B_i)}{\sum_{j=1}^{n} \mathcal{G}_{ij}} + \beta_9 F_i$$

The exposure models were misspecified as

$$\text{logit}(\Pr(A_i = 1|W_i, W_i^s)) = \beta_0 + \beta_1(B_i - 30) + \beta_2 S_i E_i + \beta_3 I\left(3 < \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij}\right) + \beta_4 F_i$$

$$\text{logit}(\Pr(A_i^s > 3|A_i, A_i^s, W_i, W_i^s)) = \beta_0 + \beta_1 A_i + \beta_2(B_i - 30) + \beta_3 S_i E_i$$
$$+\beta_4 I\left(3 < \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij}\right) + \beta_5 F_i$$

The outcome model was misspecified as

$$E[Y|A_i, A_i^s, W_i, W_i^s] = \beta_0 + \beta_1 B_i + \beta_2 A_i + \beta_3 I\left(3 < \sum_{j=1}^{n} I(A_j = 1)\mathcal{G}_{ij}\right) + \beta_4 S_i$$
$$+\beta_5 E_i + \beta_6 I\left(3 < \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij}\right) + \beta_7 \frac{\sum_{j=1}^{n} \mathcal{G}_{ij}(B_j - B_i)}{\sum_{j=1}^{n} \mathcal{G}_{ij}} + \beta_8 F_i$$

The flexible exposure and outcome models replaced $\frac{\sum_{j=1}^{n} I(E_j=1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}}$ and $\sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij}$ with a dummy variable E_i^{cs}, and $\frac{\sum_{j=1}^{n} I(S_j=1)\mathcal{G}_{ij}}{\sum_{j=1}^{n} \mathcal{G}_{ij}}$ and $\sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij}$ with a dummy variable S_i^{cs}. The corresponding values are provided below

	Uniform (n=500)	Clustered Power-Law (n=500)	eX-FLU
S^{cs}	0 if $0 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ 1 if $1 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ 2 if $2 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 3$ 3 if $3 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \leq 6$	0 if $0 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ 1 if $2 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 5$ 2 if $5 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 9$ 3 if $9 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 16$ 4 if $16 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \leq 24$	0 if $0 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ 1 if $1 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 3$ 2 if $3 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 6$ 3 if $6 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 9$ 4 if $9 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \leq 19$
E^{sc}	0 if $0 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 1$ 1 if $1 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 2$ 2 if $2 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 3$ 3 if $3 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} \leq 6$	0 if $0 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 1$ 1 if $1 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 2$ 2 if $2 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 5$ 3 if $5 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 9$ 4 if $9 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} \leq 15$	0 if $0 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 1$ 1 if $1 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 3$ 2 if $3 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 6$ 3 if $6 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 9$ 4 if $9 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} \leq 15$

	Uniform (n=1000)	Clustered Power-Law (n=1000)
S^{cs}	0 if $0 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ 1 if $1 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ 2 if $2 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 3$ 3 if $3 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 4$ 4 if $4 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \leq 6$	0 if $0 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ 1 if $1 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ 2 if $2 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 3$ 3 if $3 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 4$ 4 if $4 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 7$ 5 if $7 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \leq 26$

E^{sc}	$0 \text{ if } 0 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} \leq 6$	$0 \text{ if } 0 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 4$ $4 \text{ if } 4 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} \leq 19$

	Uniform (n=2000)	**Clustered Power-Law (n=2000)**
S^{cs}	$0 \text{ if } 0 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 4$ $4 \text{ if } 4 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \leq 6$	$0 \text{ if } 0 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 4$ $4 \text{ if } 4 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 5$ $5 \text{ if } 4 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 6$ $6 \text{ if } 6 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 9$ $7 \text{ if } 9 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \leq 30$

E^{sc}	$0 \text{ if } 0 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 4$ $4 \text{ if } 4 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} \leq 6$	$0 \text{ if } 0 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 4$ $4 \text{ if } 4 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 5$ $5 \text{ if } 5 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} < 6$ $6 \text{ if } 6 \leq \sum_{j=1}^{n} I(E_j = 1)\mathcal{G}_{ij} \leq 25$

Vaccination and Infection

Let V_i indicate asthma at baseline, H_i indicate hand hygiene, and $W_i = (V_i, H_i, F_i)$. These variables were generated from the following distributions.

$$\Pr(V_i) = 0.15$$

$$\text{logit}(\Pr(H_i = 1|V_i)) = -0.15 + 0.1V_i$$

These variables were generated once for each individual in each network and held constant across simulations. Vaccination status (indicated by A_i) was generated following

$$\text{logit}(\Pr(A_i = 1|W_i, W_i^S)) = -1.9 + 1.75V_i + 1.0H_i + 1.0\sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} + 1.3\sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} - 0.65F_i$$

Individuals transitioned between three states: susceptible, infected, and recovered. Seven individuals were randomly chosen to be the initial infections. Individuals in the infected state were actively infectious for a period of five discrete time-steps after moving from the susceptible state. After the period of five discrete time-steps, individuals transitioned to the recovered state and were no longer infectious nor capable of being infected by contacts. All transmission events occurred over a period of ten time-steps. The probability of individual i becoming infected ($D_{i,t}$) at each discrete time-point by individual j was based on the following model

$$\text{logit}\big(\Pr\big(D_{i,t} = 1\big|Z_{j,t} = 1, \mathcal{G}_{ij} = 1, A_i, A_j, W_i\big)\big) = -2.5 - 1.0A_i - 0.2A_j + 1.0V_i - 0.2H_i$$

where $Z_{j,t} = 1$ indicates whether j was in the infectious category at time t. Probabilities of becoming infected were assessed separately for each infected contact. Infected individuals were actively infectious for five discrete time-steps and the transmission process continued for a total of 20 discrete time-steps.

The 'correctly' specified models considered were

$$\text{logit}(\Pr(A_i = 1|W_i, W_i^S)) = \beta_0 + \beta_1 V_i + \beta_2 H_i + \beta_3 \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} + \beta_4 \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} + \beta_5 F_i$$

$$\log(E[A_i^S|A_i, W_i, W_i^S]) = \beta_0 + \beta_1 A_i + \beta_2 V_i + \beta_3 H_i + \beta_4 \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} + \beta_5 \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} + \beta_6 F_i$$

$$\text{logit}(\Pr(Y_i = 1|A_i, A_i^S, W_i, W_i^S)) = \beta_0 + \beta_1 A_i + \beta_2 \sum_{j=1}^{n} I(A_j = 1)\mathcal{G}_{ij} + \beta_3 V_i + \beta_4 \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} + \beta_5 H_i + \beta_6 \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} + \beta_7 F_i$$

The exposure models were misspecified as

$$\text{logit}(\Pr(A_i = 1|W_i, W_i^s)) = \beta_0 + \beta_1 V_i + \beta_2 H_i + \beta_3 I\left(3 < \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij}\right) + \beta_5 F_i$$

$$\log(E[A_i^s|A_i, W_i, W_i^s]) = \beta_0 + \beta_1 A_i + \beta_2 V_i + \beta_3 H_i + \beta_4 I\left(3 < \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij}\right) + \beta_6 F_i$$

The outcome model was misspecified as

$$\text{logit}(\Pr(Y_i = 1|A_i, A_i^s, W_i, W_i^s)) = \beta_0 + \beta_1 A_i + \beta_2 \sum_{j=1}^{n} I(A_j = 1)\mathcal{G}_{ij} + \beta_3 V_i$$
$$+\beta_4 I\left(3 < \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij}\right) + \beta_5 H_i + \beta_7 F_i$$

The flexible exposure and outcome models replaced $\sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij}$ with the dummy variable H_i^{cs}, and $\sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij}$ with the dummy variable V_i^{cs}. The dummy variable values are given below

	Uniform (n=500)	**Clustered Power-Law (n=500)**	**eX-FLU**
H^{cs}	0 if $0 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ 1 if $1 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ 2 if $2 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \leq 6$	0 if $0 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 1$ 1 if $1 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 2$ 2 if $2 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 4$ 3 if $4 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 7$ 4 if $7 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} \leq 18$	0 if $0 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 1$ 1 if $1 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 2$ 2 if $2 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 4$ 3 if $4 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 8$ 4 if $8 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} \leq 18$

V^{sc}	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} \le 3$	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 4$ $3 \text{ if } 4 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 10$	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 4$ $3 \text{ if } 4 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 10$

	Uniform (n=1000)	**Clustered Power-Law (n=1000)**
H^{cs}	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \le \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \le 6$	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \le \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 4$ $4 \text{ if } 4 \le \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 8$ $5 \text{ if } 8 \le \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} \le 26$
V^{sc}	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} \le 5$	$0 \text{ if } 0 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \le \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} \le 10$

	Uniform (n=2000)	Clustered Power-Law (n=2000)
H^{cs}	$0 \text{ if } 0 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} < 4$ $4 \text{ if } 4 \leq \sum_{j=1}^{n} I(S_j = 1)\mathcal{G}_{ij} \leq 6$	$0 \text{ if } 0 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 4$ $4 \text{ if } 4 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 6$ $5 \text{ if } 6 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} < 9$ $6 \text{ if } 9 \leq \sum_{j=1}^{n} I(H_j = 1)\mathcal{G}_{ij} \leq 26$
V^{sc}	$0 \text{ if } 0 \leq \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \leq \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \leq \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 3$ $3 \text{ if } 3 \leq \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} \leq 6$	$0 \text{ if } 0 \leq \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 1$ $1 \text{ if } 1 \leq \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 2$ $2 \text{ if } 2 \leq \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 4$ $3 \text{ if } 4 \leq \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} < 8$ $4 \text{ if } 8 \leq \sum_{j=1}^{n} I(V_j = 1)\mathcal{G}_{ij} \leq 18$

Table B.2: Baseline confounder distributions by data-generating mechanisms

	Uniform (n=500) % / median (IQR)	Clustered Power-Law (n=500) % / median (IQR)	eX-FLU (n=467) % / median (IQR)
Statin DGM			
Age	50 (45, 55)	49 (44, 55)	50 (44, 55)
log(LDL)	4.9 (4.7, 5.0)	4.8 (4.7, 5.0)	4.9 (4.7, 5.0)
Risk score	0.05 (0.03, 0.11)	0.06 (0.03, 0.13)	0.06 (0.03, 0.13)
Statins*	25%	24%	24%
ASCVD*	40%	39%	39%
Naloxone DGM			
Gender	29%	37%	30%
Recently released from prison	31%	31%	28%
Recent overdose	20%	21%	21%
Naloxone*	35%	36%	34%
Overdose*	19%	12%	13%
Diet DGM			
Gender	49%	52%	54%
Baseline BMI	29 (25, 34)	29 (25, 34)	30 (26, 35)
Exercise	41%	36%	36%
Diet*	48%	51%	52%
BMI*	30.3	28.6	27.9
Transmission DGM			
Asthma	15%	14%	18%
Hand hygiene	43%	47%	44%
Vaccine*	30%	37%	34%
Infection*	5%	14%	24%

DGM: data generating mechanism, ASCVD: atherosclerotic cardiovascular disease, IQR: interquartile range, log(LDL): log-transformed low-density lipoprotein, BMI: body mass index
* Percentages were calculated as the mean of the probability of exposure across all individuals for the data generating mechanism and the network. The continuous outcome was calculated as the mean of the mean value across simulations.

Table B.3: Baseline confounder distributions for $n = 1000$

	Uniform (n=1000) % / median (IQR)	Clustered Power-Law (n=1000) % / median (IQR)
Statin DGM		
Age	50 (45, 55)	50 (45, 55)
log(LDL)	4.9 (4.7, 5.0)	4.9 (4.7, 5.0)
Risk score	0.07 (0.03, 0.12)	0.06 (0.03, 0.12)
Statins*	25%	26%
ASCVD*	40%	40%
Naloxone DGM		
Gender	30%	34%
Recently released from prison	31%	31%
Recent overdose	20%	20%
Naloxone*	36%	35%
Overdose*	18%	12%
Diet DGM		
Gender	53%	50%
Baseline BMI	30 (26, 35)	30 (25, 34)
Exercise	37%	40%
Diet*	50%	52%
BMI*	31.5	28.8
Transmission DGM		
Asthma	14%	12%
Hand hygiene	48%	47%
Vaccine*	30%	28%
Infection*	5%	19%

DGM: data generating mechanism, ASCVD: atherosclerotic cardiovascular disease, IQR: interquartile range, log(LDL): log-transformed low-density lipoprotein, BMI: body mass index
* Percentages for exposures were calculated as the mean of the probability of exposure across all individuals for the data generating mechanism and the network. The continuous outcome was calculated as the mean of the mean value across simulations.

Table B.4: Baseline confounder distributions for $n = 2000$

	Uniform (n=2000) % / median (IQR)	Clustered Power-Law (n=2000) % / median (IQR)
Statin DGM		
Age	50 (45, 55)	50 (45, 55)
log(LDL)	4.9 (4.7, 5.0)	4.9 (4.7, 5.0)
Risk score	0.06 (0.03, 0.11)	0.06 (0.03, 0.13)
Statins*	25%	26%
ASCVD*	40%	40%
Naloxone DGM		
Gender	30%	32%
Recently released from prison	29%	29%
Recent overdose	19%	18%
Naloxone*	36%	36%
Overdose*	17%	9%
Diet DGM		
Gender	48%	53%
Baseline BMI	30 (26, 35)	30 (26, 35)
Exercise	36%	36%
Diet*	47%	53%
BMI*	30.9	28.1
Transmission DGM		
Asthma	15%	15%
Hand hygiene	47%	48%
Vaccine*	30%	35%
Infection*	4%	16%

DGM: data generating mechanism, ASCVD: atherosclerotic cardiovascular disease, IQR: interquartile range, log(LDL): log-transformed low-density lipoprotein, BMI: body mass index
* Percentages for exposures were calculated as the mean of the probability of exposure across all individuals for the data generating mechanism and the network. The continuous outcome was calculated as the mean of the mean value across simulations.

Appendix C: Simulation results in graphical format

Statin and cardiovascular disease

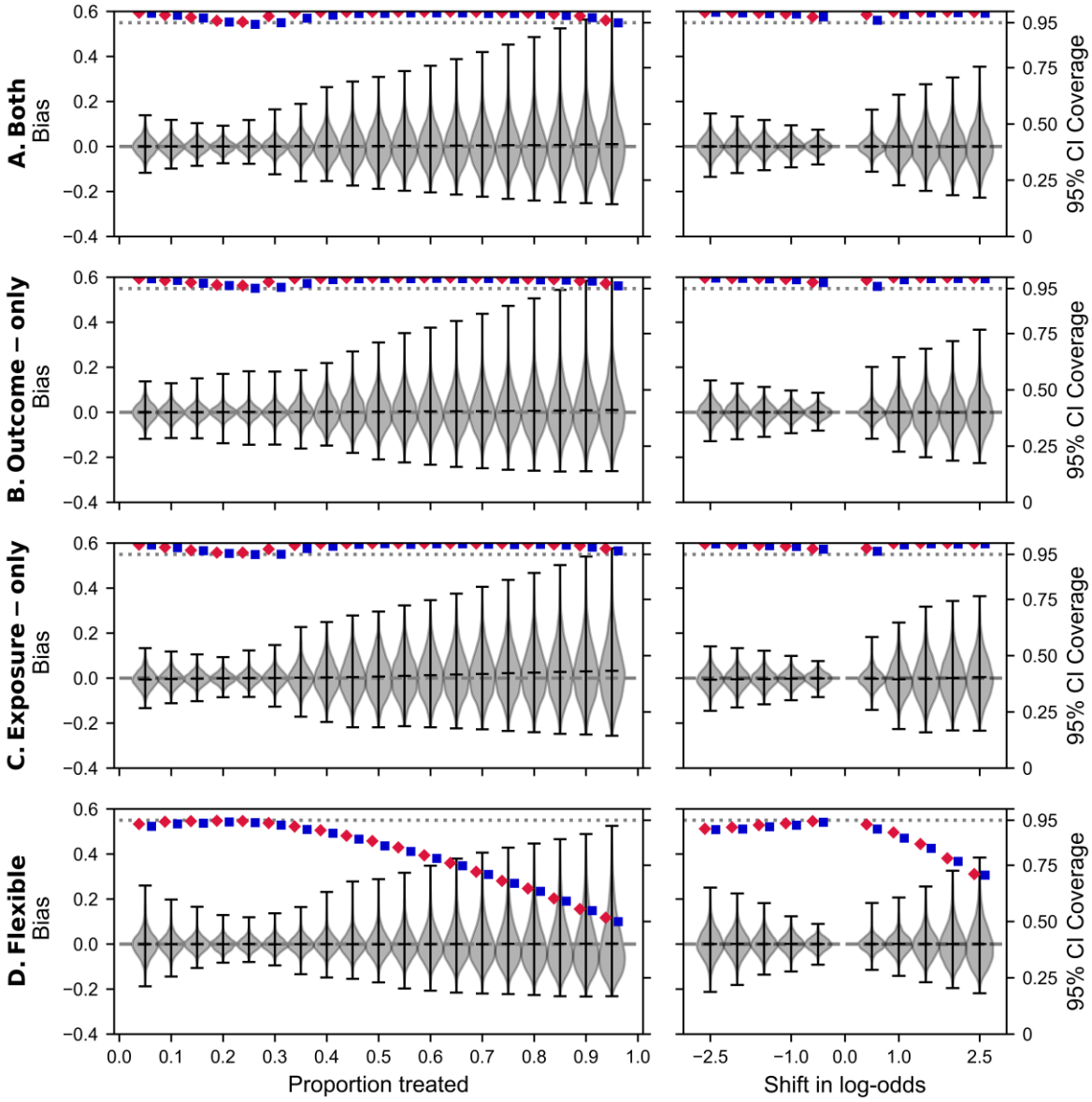

Figure C.1: Target maximum likelihood estimation for statins and atherosclerotic heart disease, and the eX-FLU network unrestricted by degree.

Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of statins. The second column corresponds to the shift in log-odds of the predicted probability of statins for each individual.

A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^S.

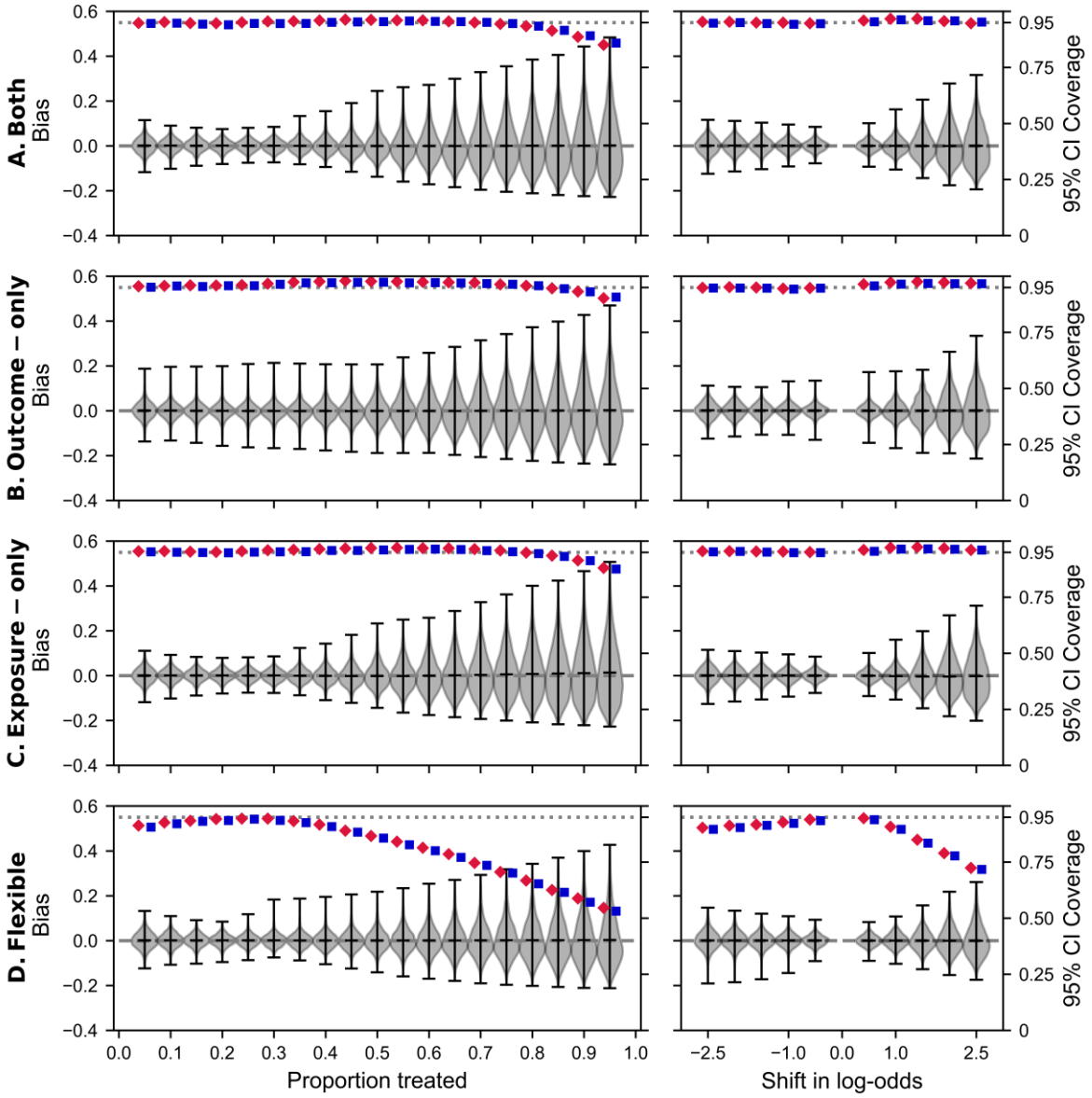

Figure C.2: Target maximum likelihood estimation for statins and atherosclerotic heart disease, and the clustered power-law random graph ($n = 500$) restricted by degree.
The maximum degree for participants was restricted to be 18 or less. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of statins. The second column corresponds to the shift in log-odds of the predicted probability of statins for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

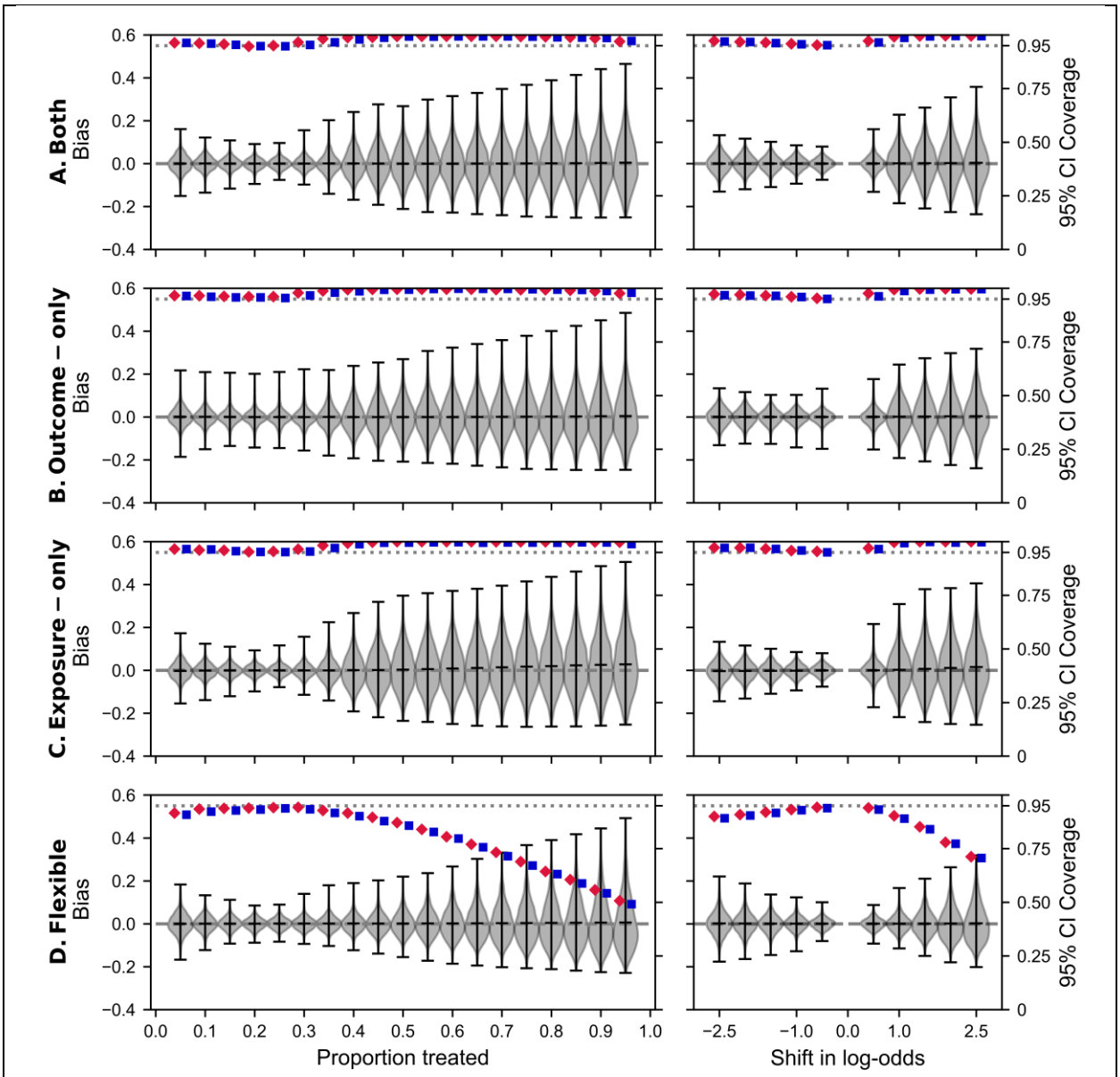

Figure C.3: Target maximum likelihood estimation for statins and atherosclerotic heart disease, and the clustered power-law random graph ($n = 500$) unrestricted by degree.
Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of statins. The second column corresponds to the shift in log-odds of the predicted probability of statins for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

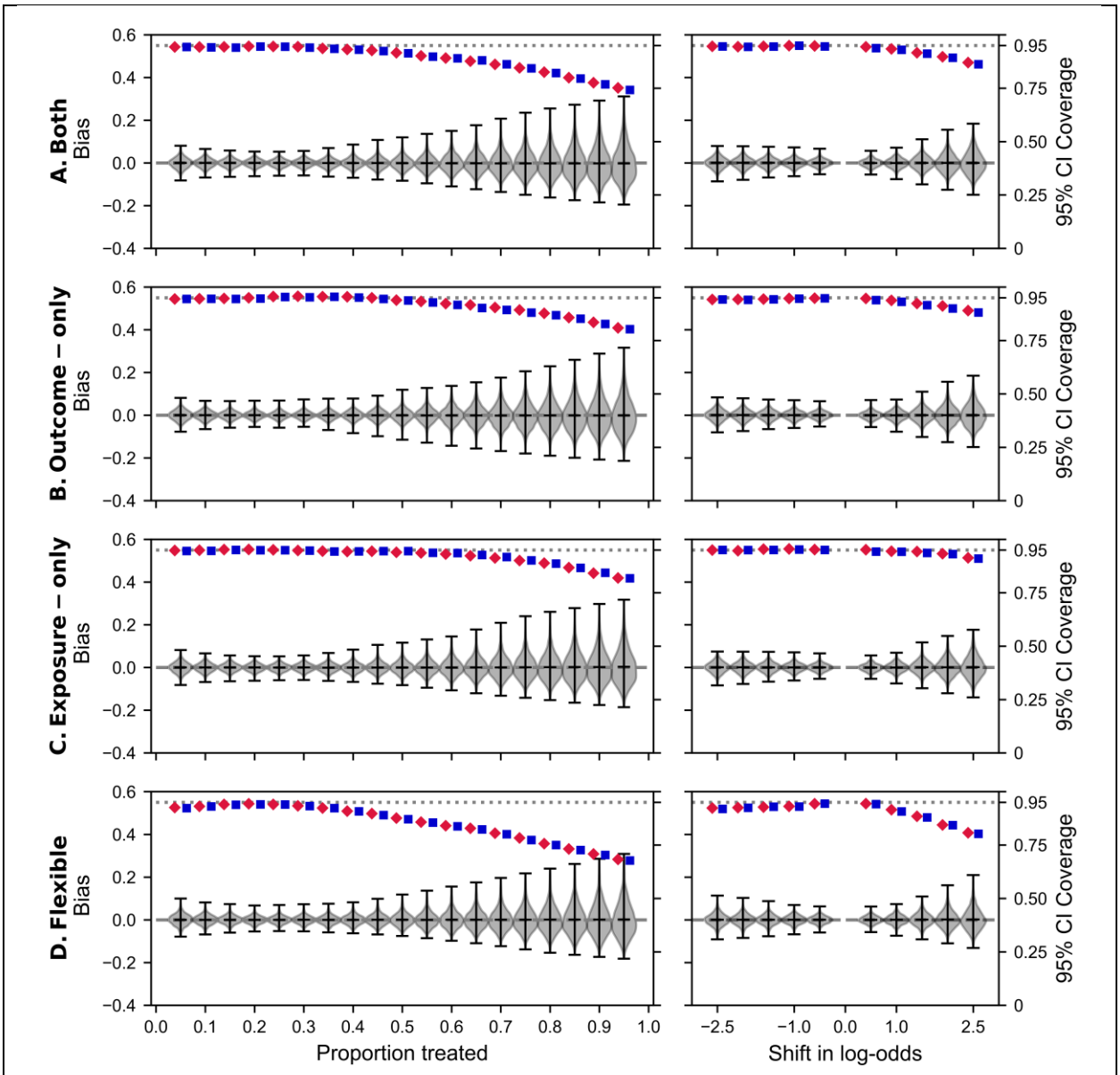

Figure C.4: Target maximum likelihood estimation for statins and atherosclerotic heart disease, and the uniform random graph ($n = 1000$).

Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of statins. The second column corresponds to the shift in log-odds of the predicted probability of statins for each individual.

A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

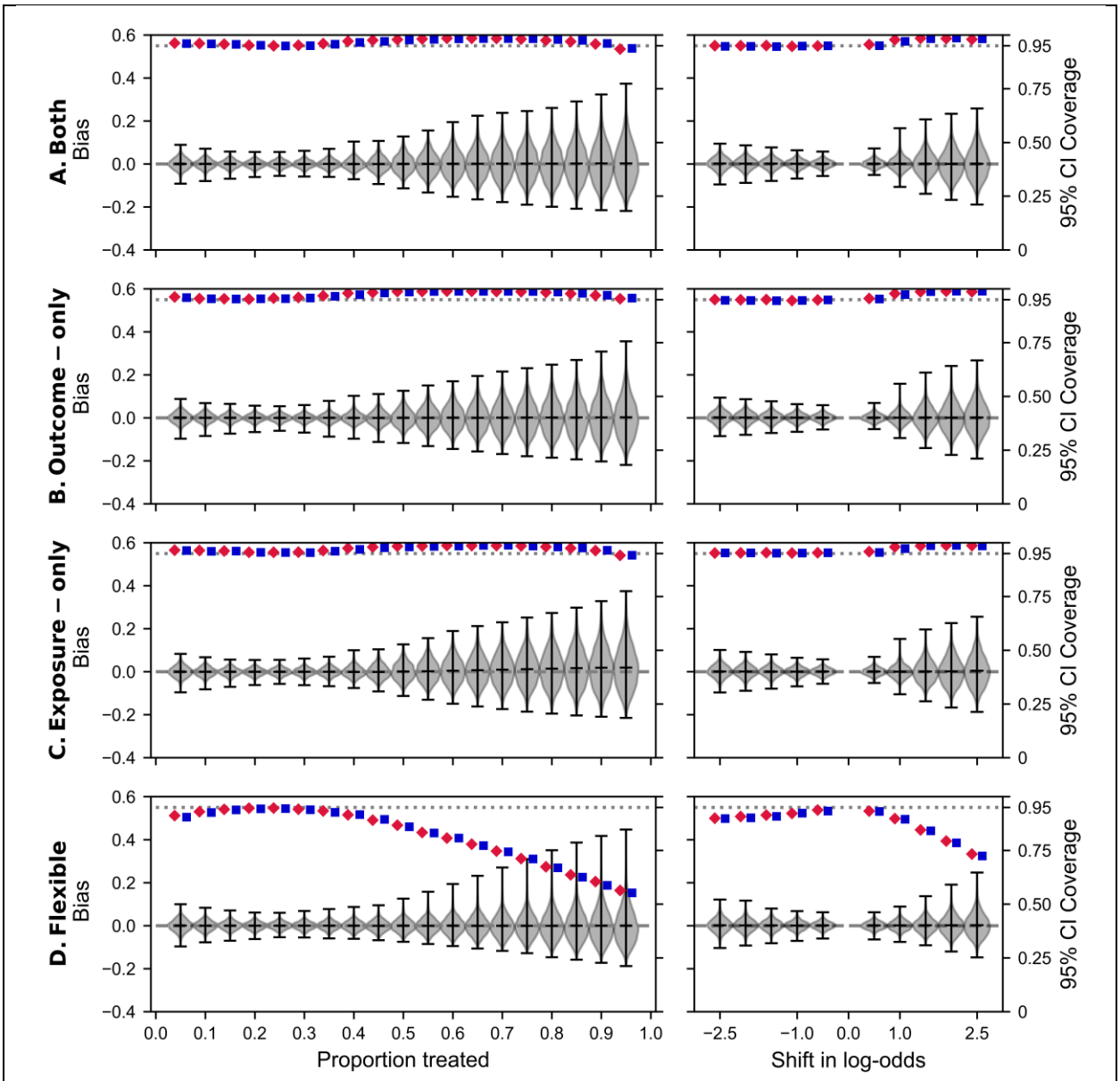

Figure C.5: Target maximum likelihood estimation for statins and atherosclerotic heart disease, and the clustered power-law random graph ($n = 1000$) restricted by degree.
The maximum degree for participants was restricted to be 22 or less. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of statins. The second column corresponds to the shift in log-odds of the predicted probability of statins for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

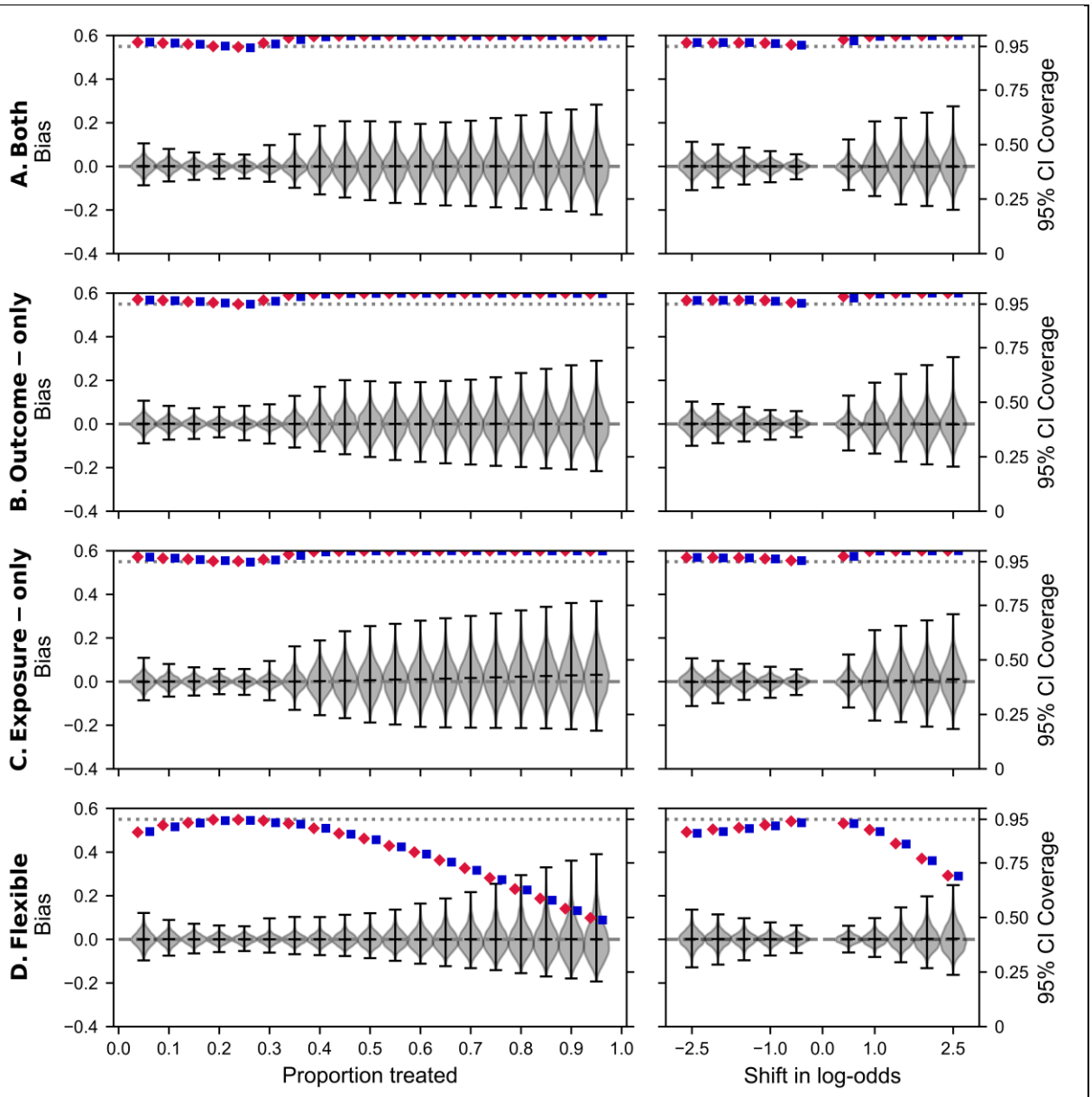

Figure C.6: Target maximum likelihood estimation for statins and atherosclerotic heart disease, and the clustered power-law random graph ($n = 1000$) unrestricted by degree.
Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of statins. The second column corresponds to the shift in log-odds of the predicted probability of statins for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

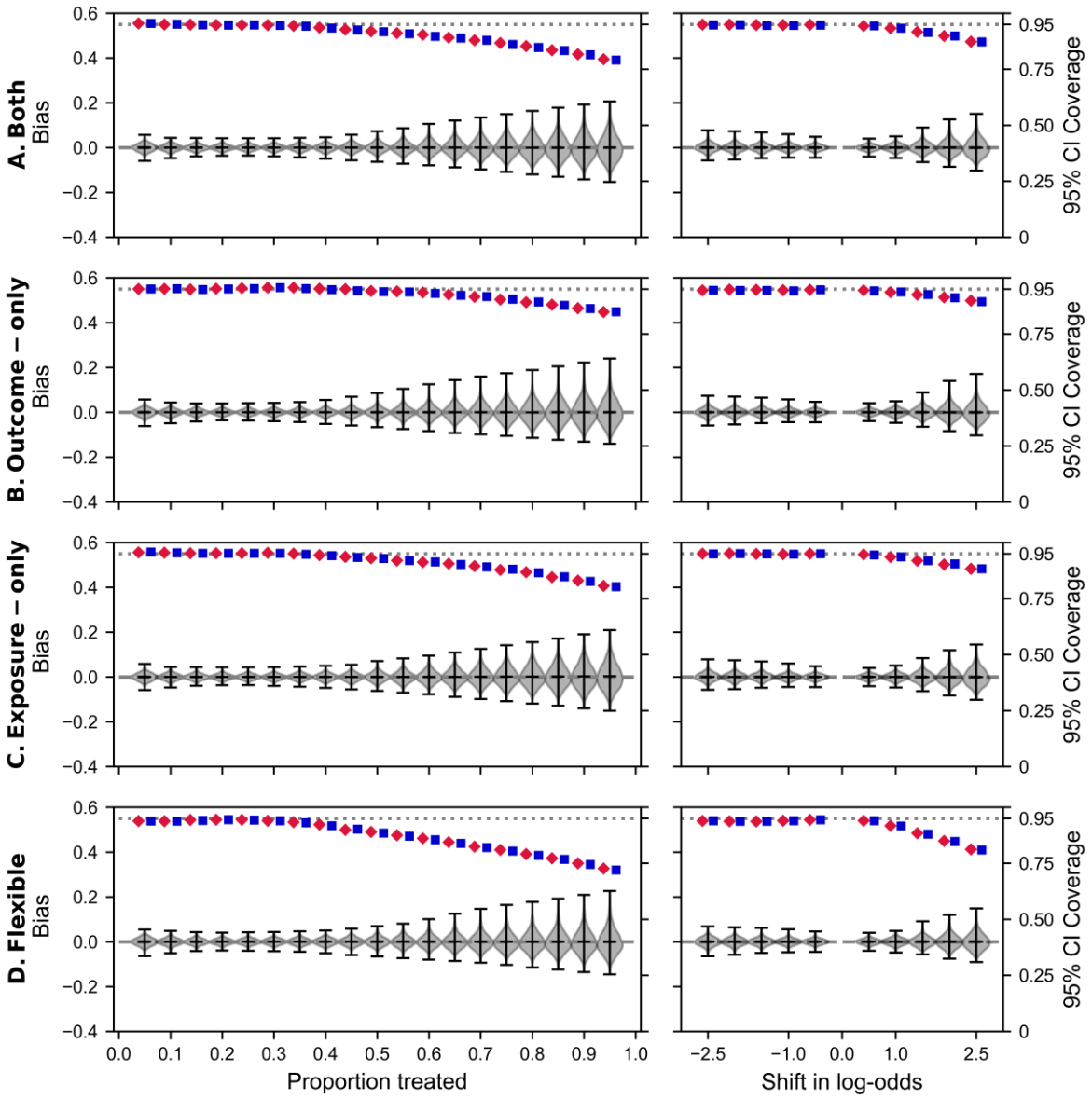

Figure C.7: Target maximum likelihood estimation for statins and atherosclerotic heart disease, and the uniform random graph ($n = 2000$).

Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of statins. The second column corresponds to the shift in log-odds of the predicted probability of statins for each individual.

A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

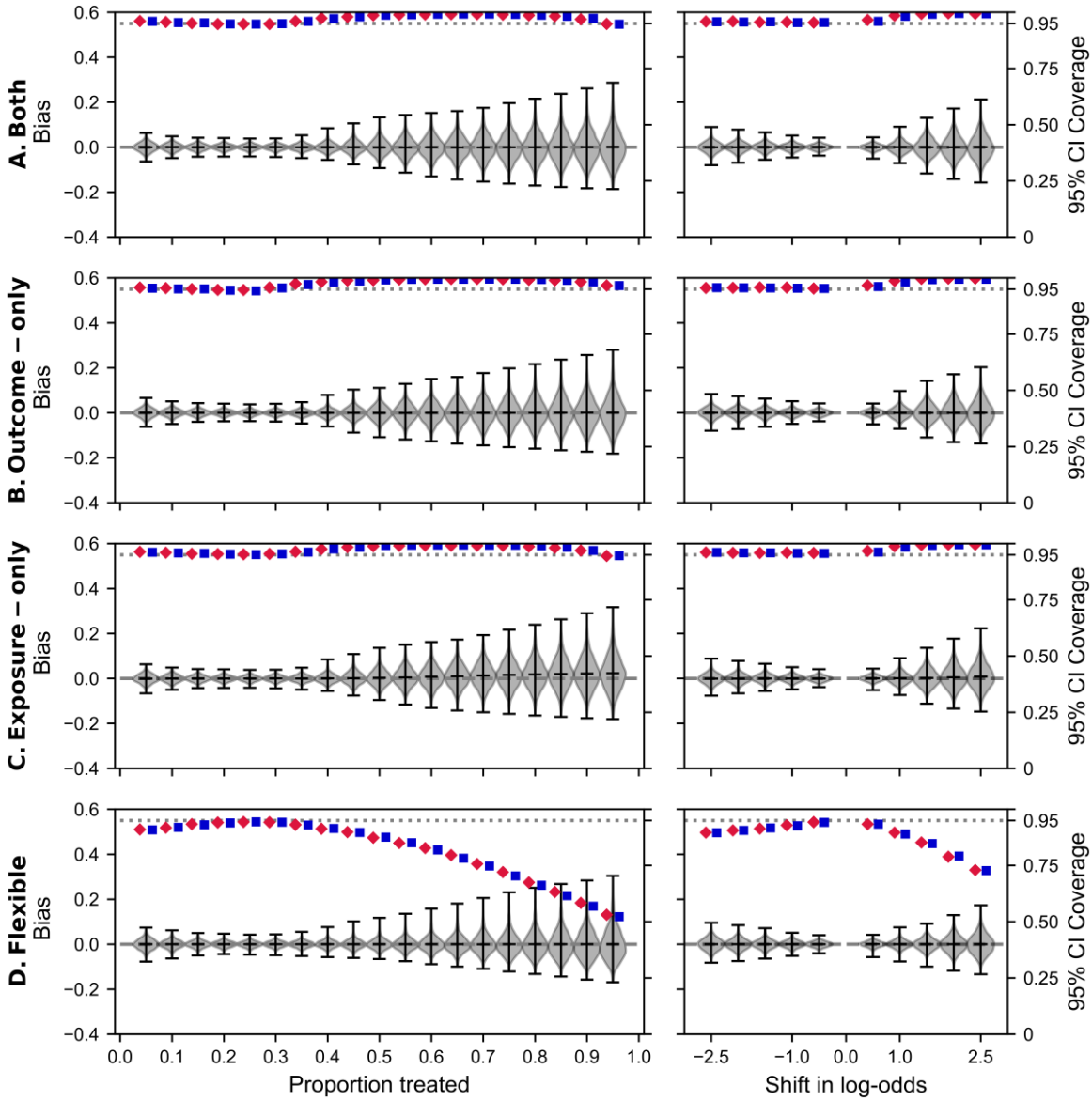

Figure C.8: Target maximum likelihood estimation for statins and atherosclerotic heart disease, and the clustered power-law random graph ($n = 2000$) restricted by degree.
The maximum degree for participants was restricted to be 22 or less. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of statins. The second column corresponds to the shift in log-odds of the predicted probability of statins for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

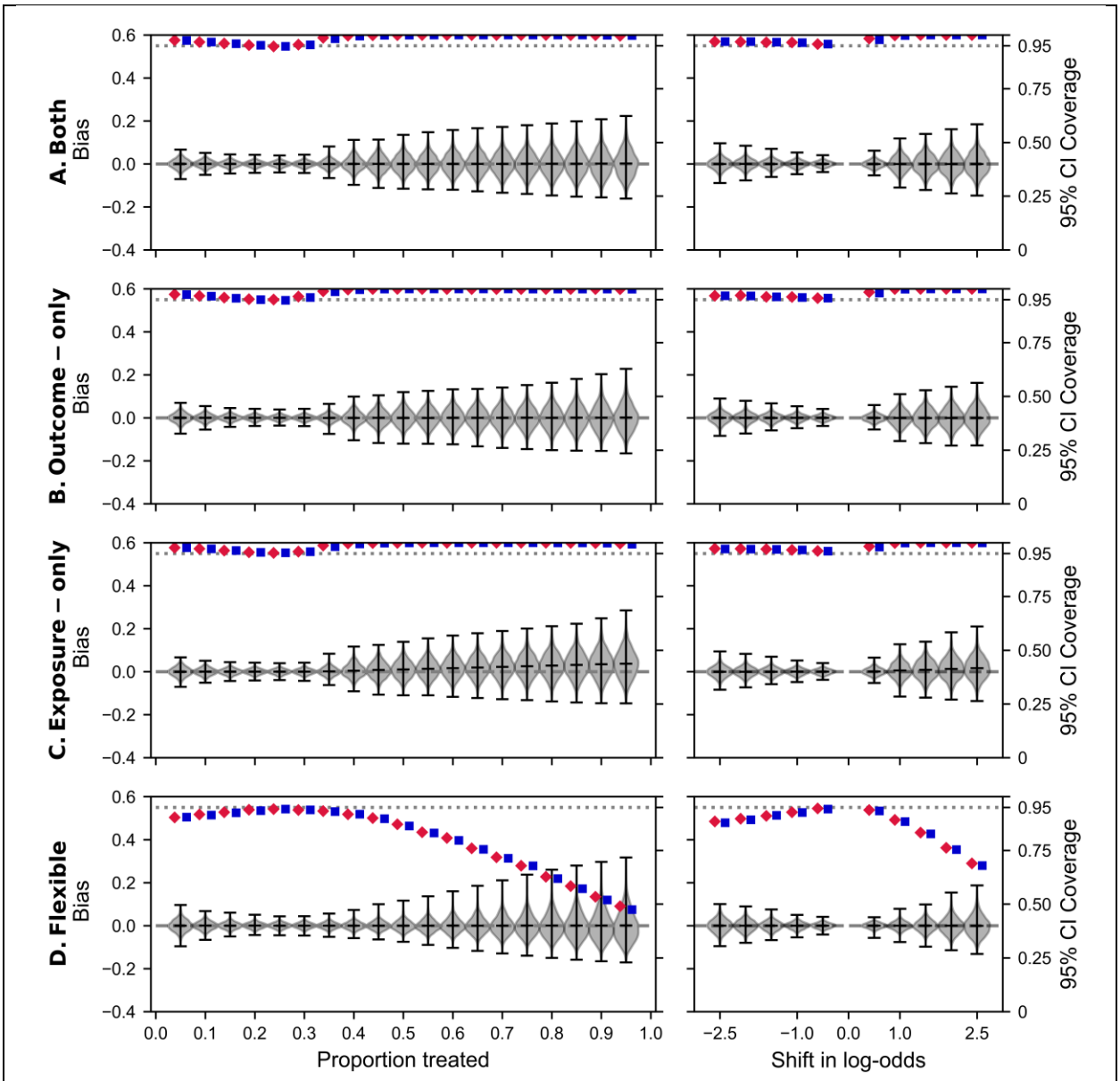

Figure C.9: Target maximum likelihood estimation for statins and atherosclerotic heart disease, and the clustered power-law random graph ($n = 2000$) unrestricted by degree.
Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of statins. The second column corresponds to the shift in log-odds of the predicted probability of statins for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

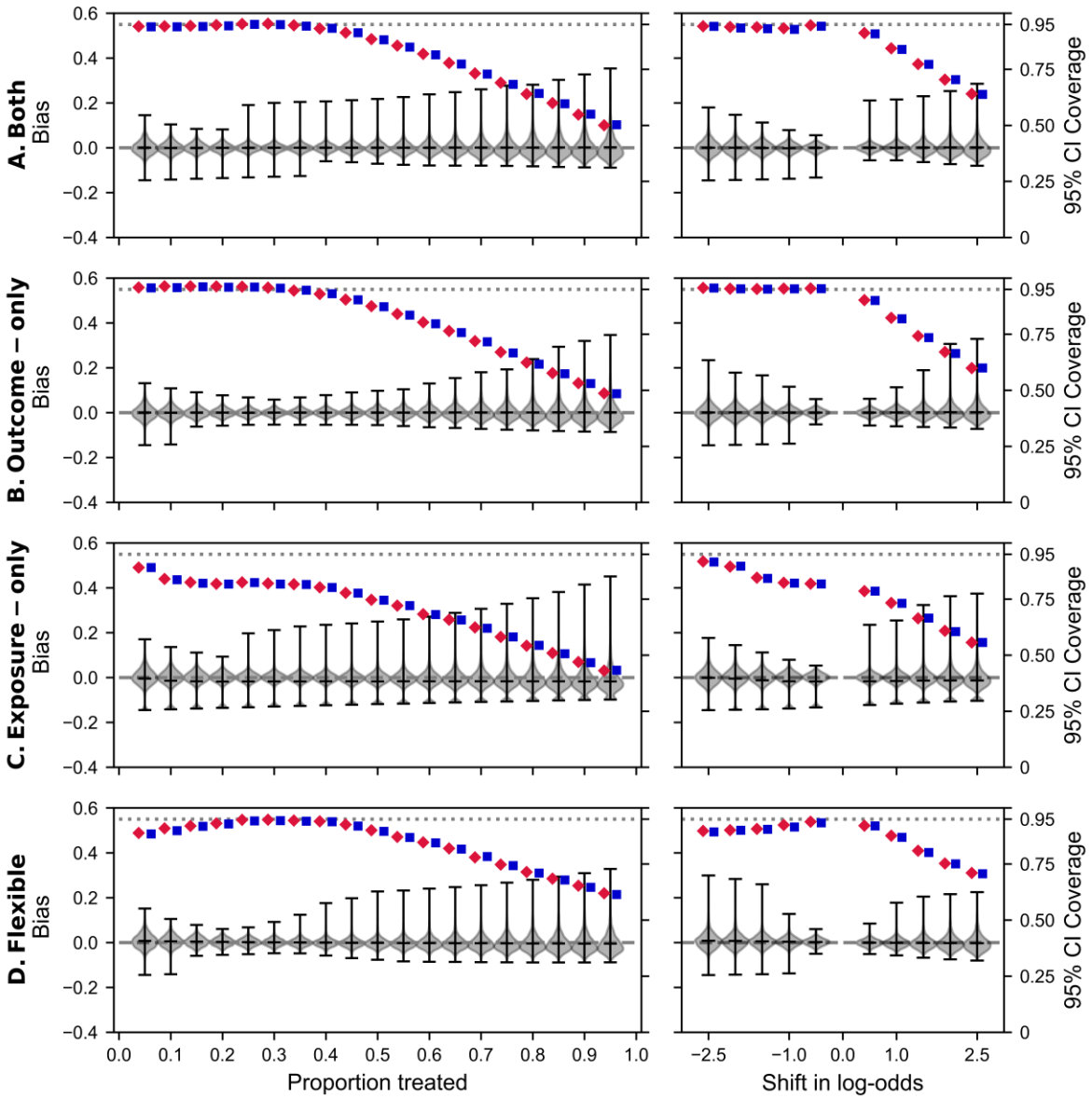

Figure C.10: Target maximum likelihood estimation for naloxone and opioid overdose, and the eX-FLU network unrestricted by degree.

Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of naloxone. The second column corresponds to the shift in log-odds of the predicted probability of naloxone for each individual.

A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

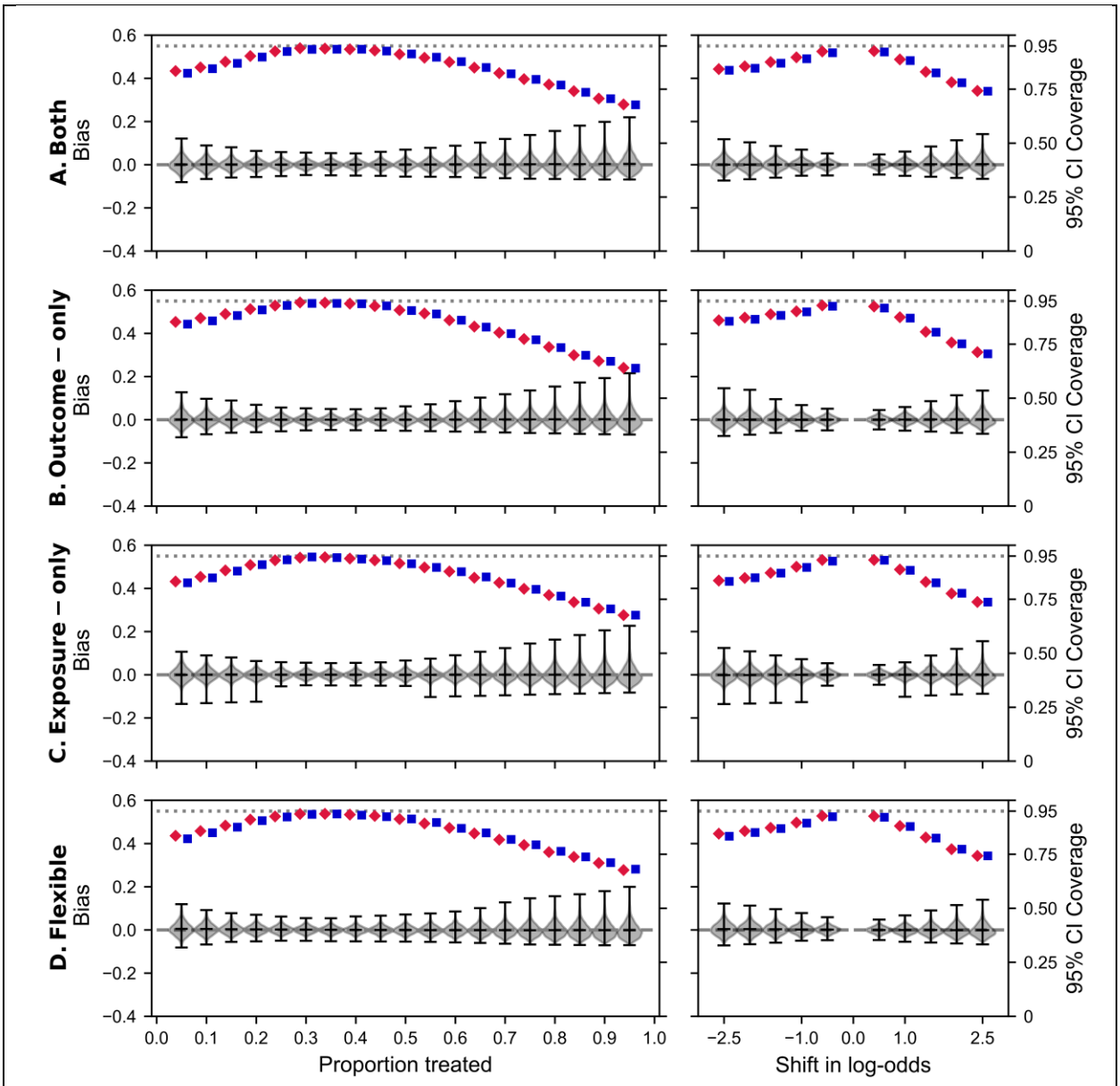

Figure C.11: Target maximum likelihood estimation for naloxone and opioid overdose, and the clustered power-law random graph ($n = 500$) restricted by degree.
The maximum degree for participants was restricted to be 18 or less. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of naloxone. The second column corresponds to the shift in log-odds of the predicted probability of naloxone for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

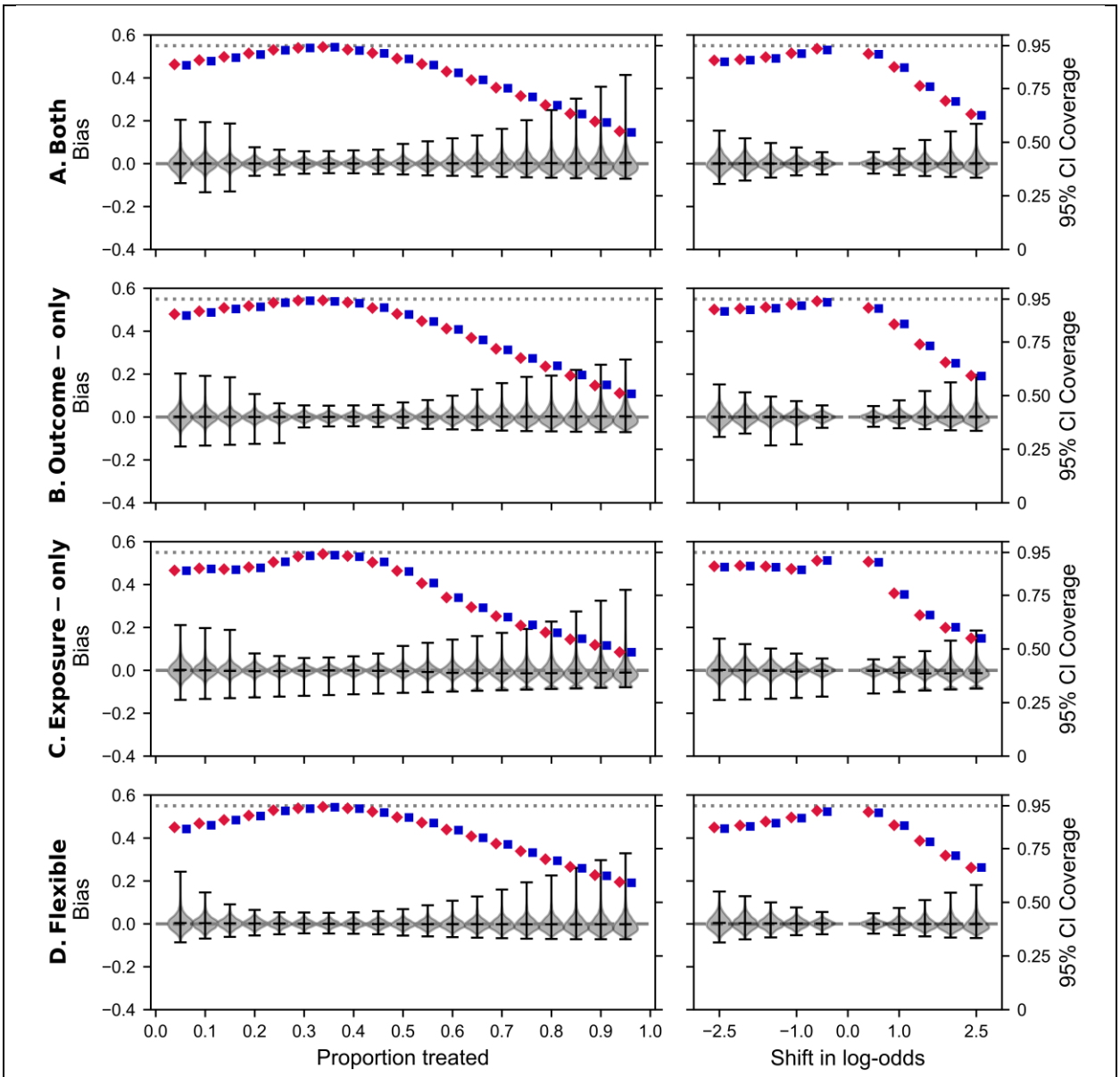

Figure C.12: Target maximum likelihood estimation for naloxone and opioid overdose, and the clustered power-law random graph ($n = 500$) unrestricted by degree.

Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of naloxone. The second column corresponds to the shift in log-odds of the predicted probability of naloxone for each individual.

A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

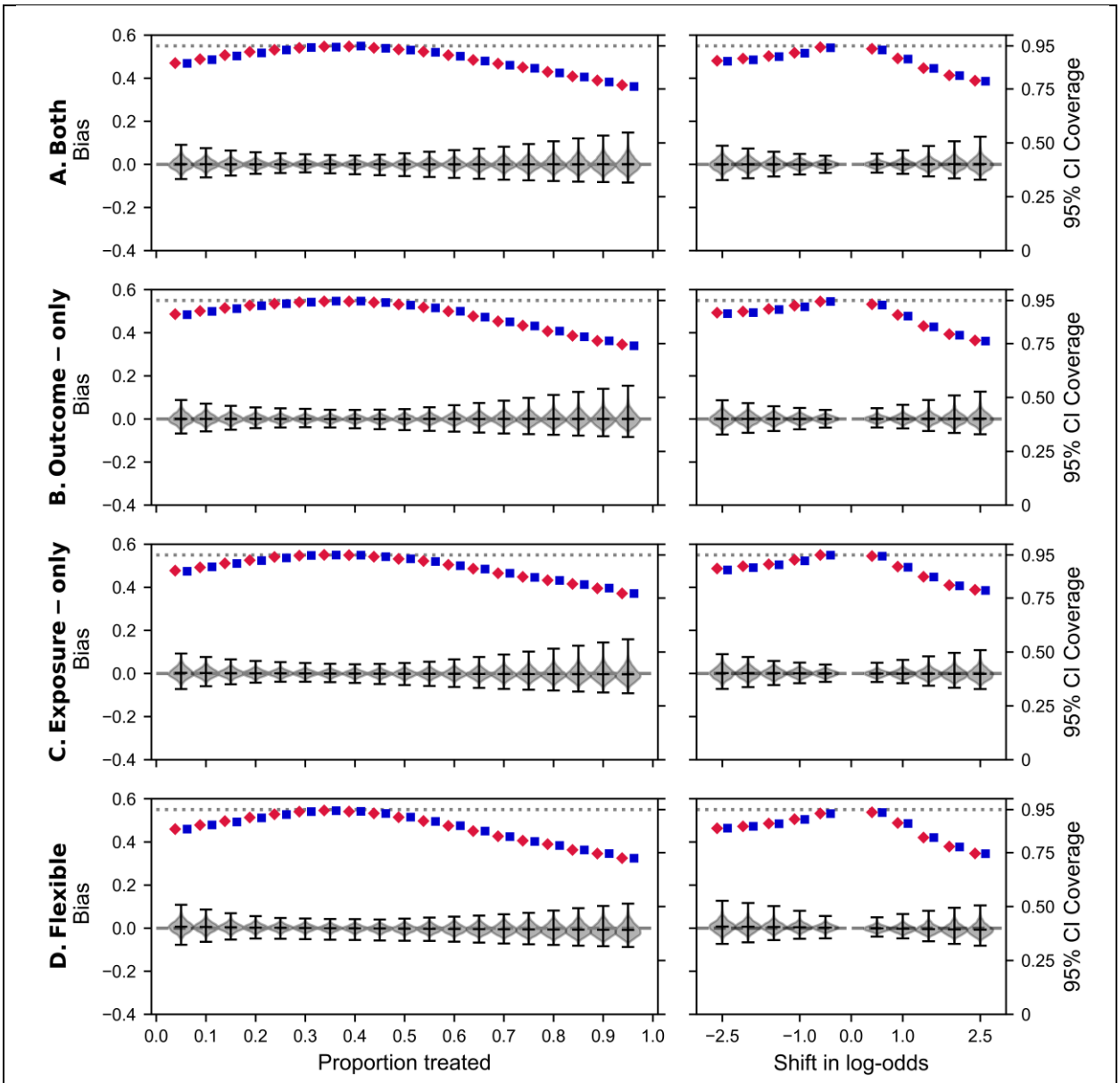

Figure C.13: Target maximum likelihood estimation for naloxone and opioid overdose, and the uniform random graph ($n = 1000$).

Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of naloxone. The second column corresponds to the shift in log-odds of the predicted probability of naloxone for each individual.

A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

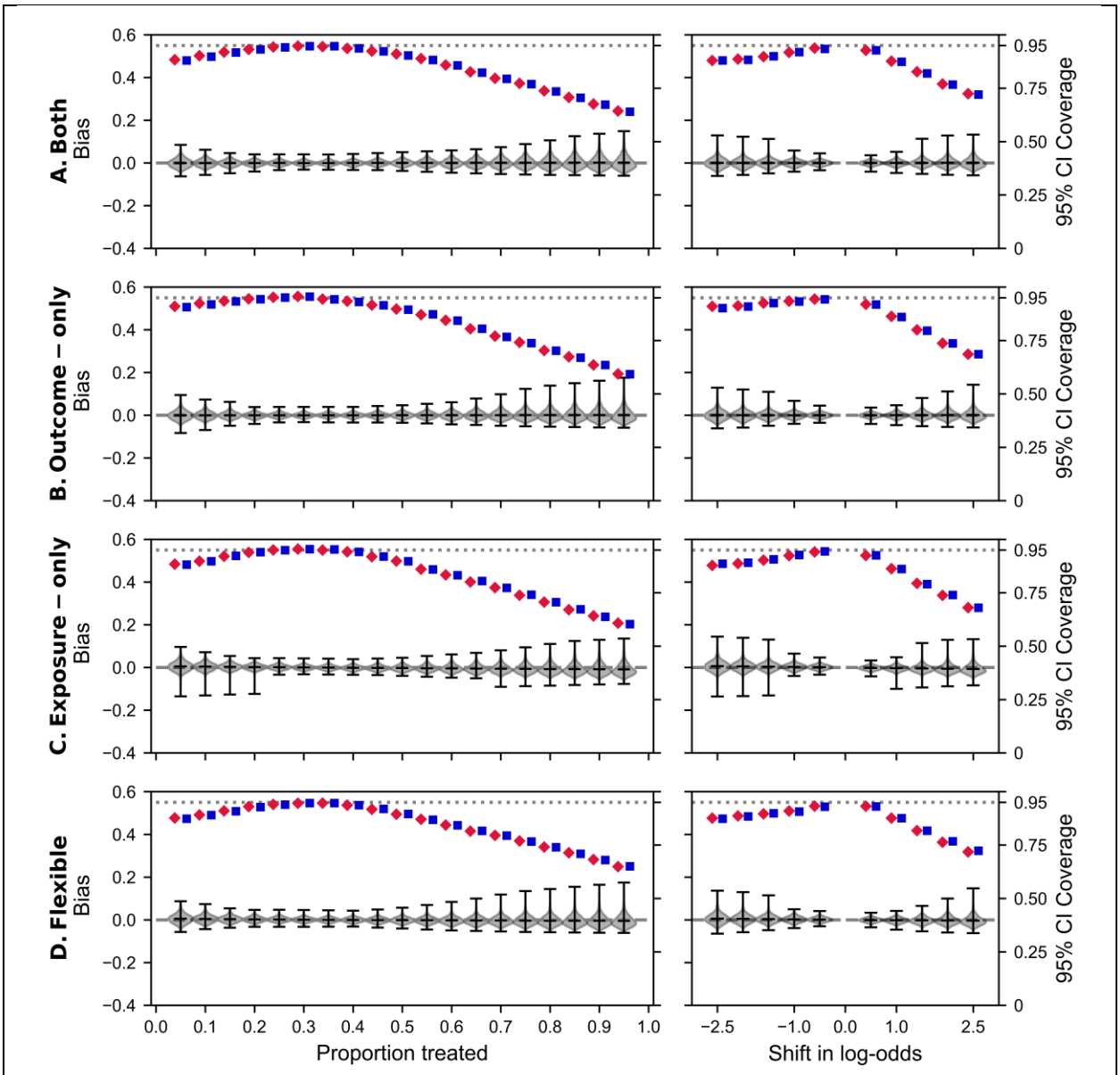

Figure C.14: Target maximum likelihood estimation for naloxone and opioid overdose, and the clustered power-law random graph ($n = 1000$) restricted by degree.
The maximum degree for participants was restricted to be 22 or less. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of naloxone. The second column corresponds to the shift in log-odds of the predicted probability of naloxone for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

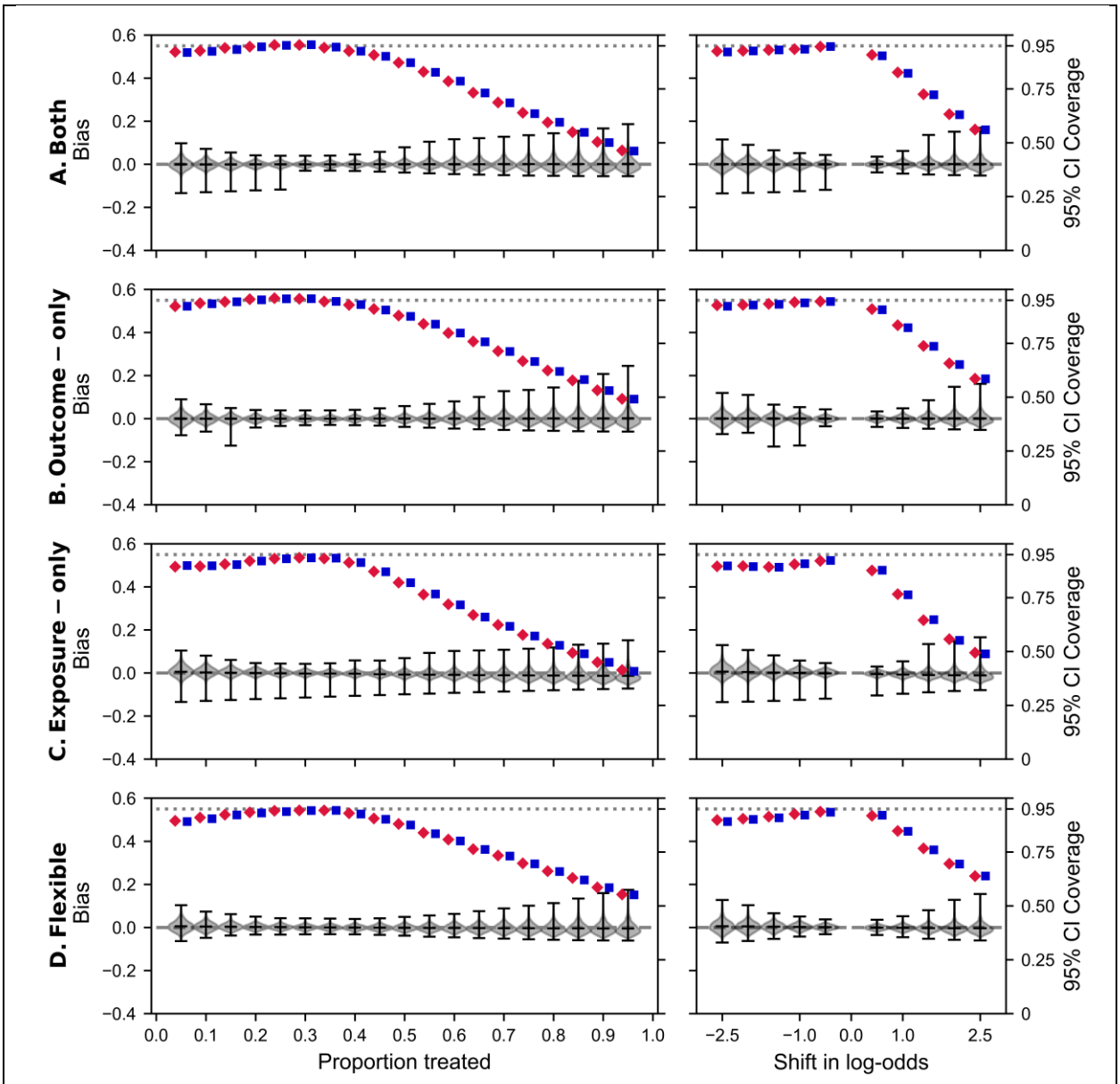

Figure C.15: Target maximum likelihood estimation for naloxone and opioid overdose, and the clustered power-law random graph ($n = 1000$) unrestricted by degree.
Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of naloxone. The second column corresponds to the shift in log-odds of the predicted probability of naloxone for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

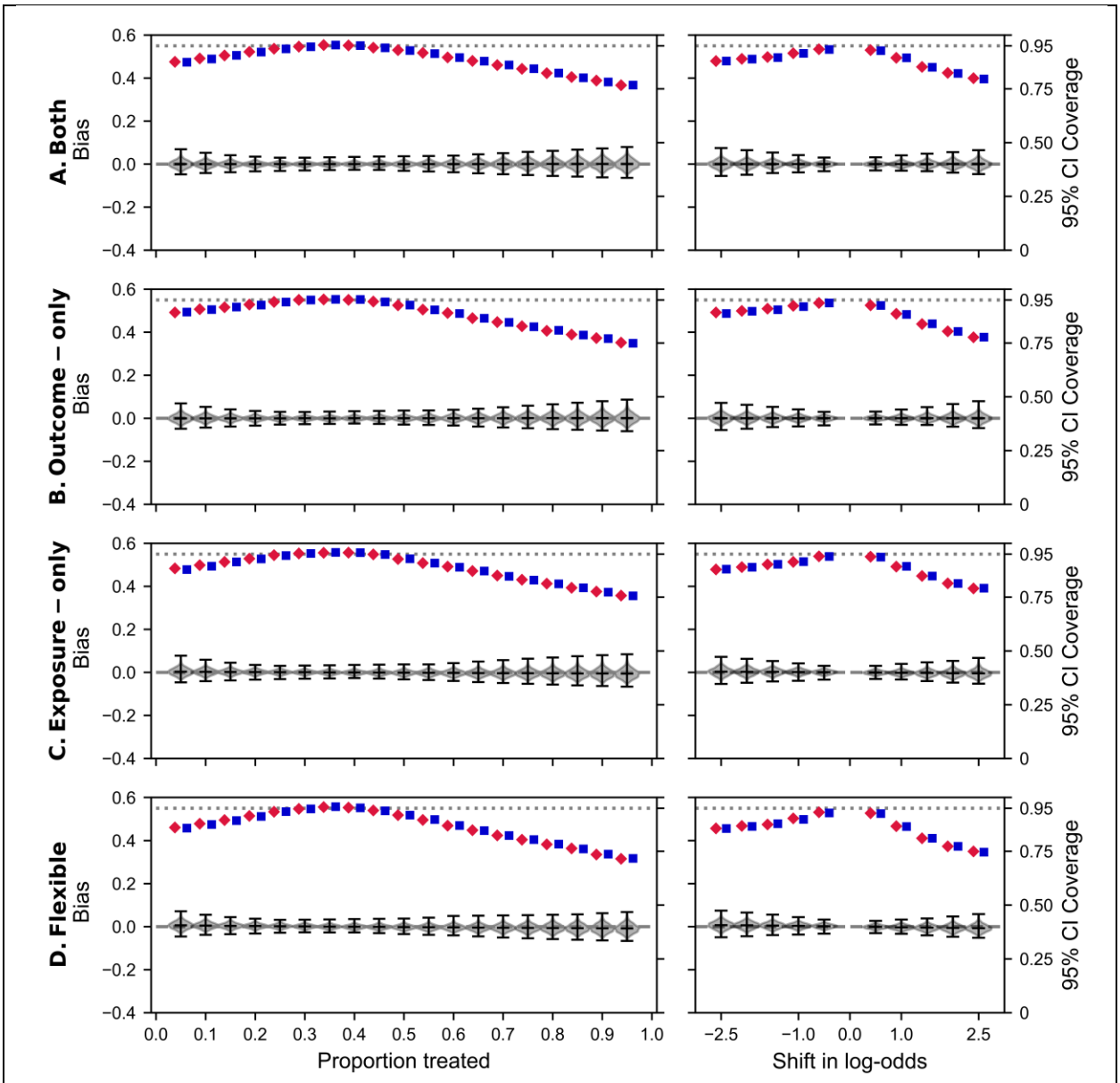

Figure C.16: Target maximum likelihood estimation for naloxone and opioid overdose, and the uniform random graph ($n = 2000$).

Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of naloxone. The second column corresponds to the shift in log-odds of the predicted probability of naloxone for each individual.

A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

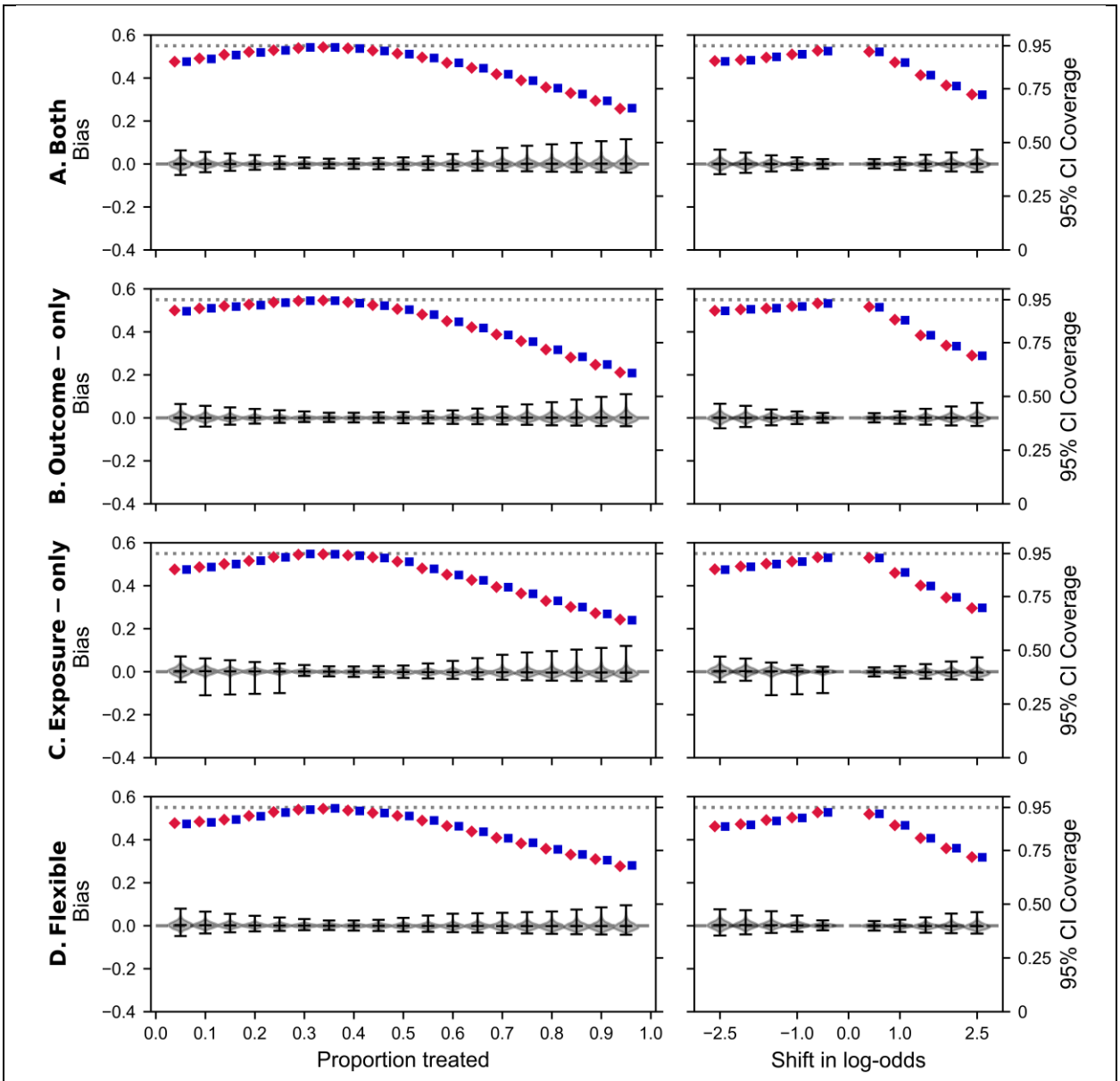

Figure C.17: Target maximum likelihood estimation for naloxone and opioid overdose, and the clustered power-law random graph ($n = 2000$) restricted by degree.

The maximum degree for participants was restricted to be 22 or less. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of naloxone. The second column corresponds to the shift in log-odds of the predicted probability of naloxone for each individual. A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

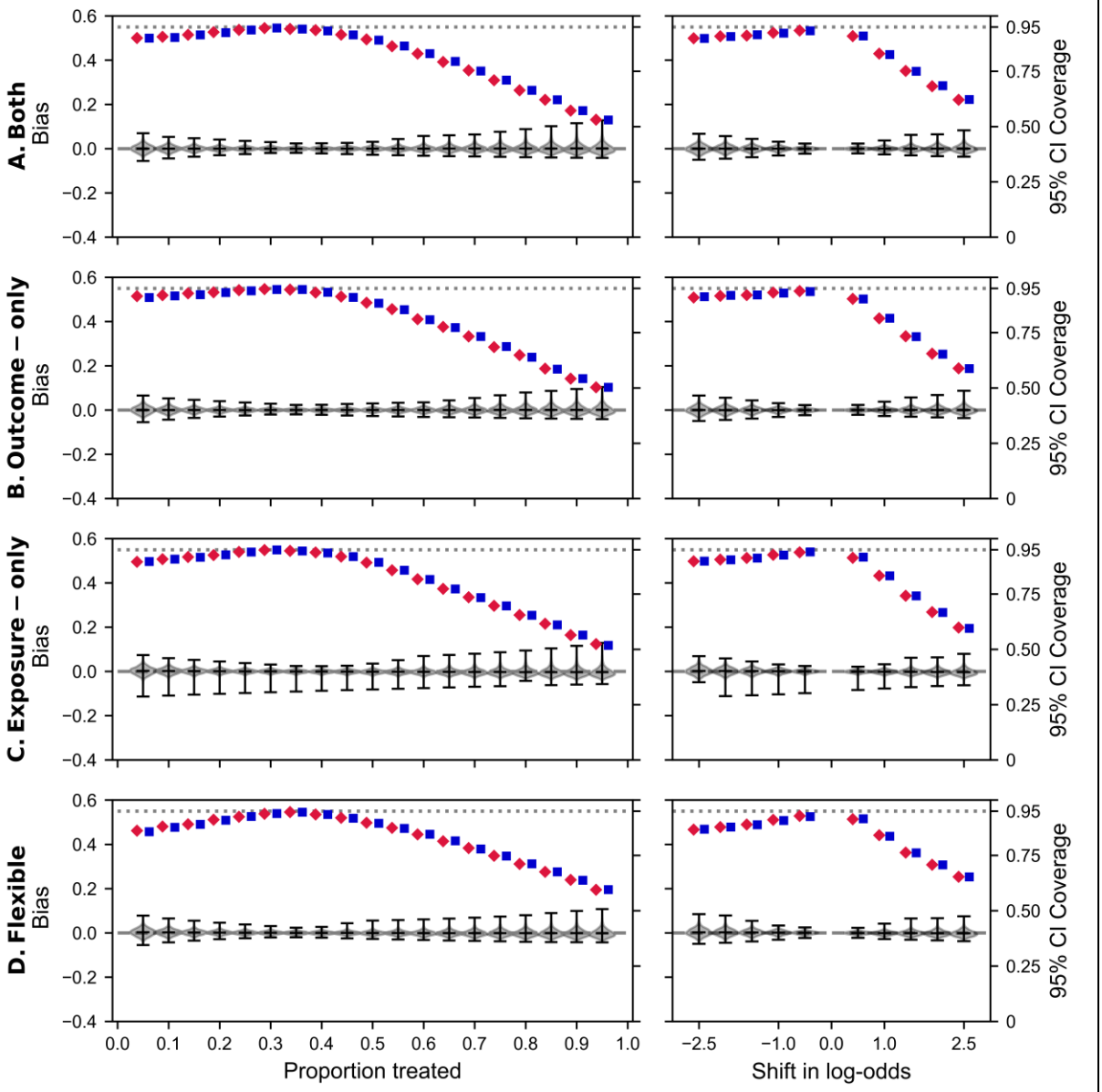

Figure C.18: Target maximum likelihood estimation for naloxone and opioid overdose, and the clustered power-law random graph ($n = 2000$) unrestricted by degree.
Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of naloxone. The second column corresponds to the shift in log-odds of the predicted probability of naloxone for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

Diet and body mass index

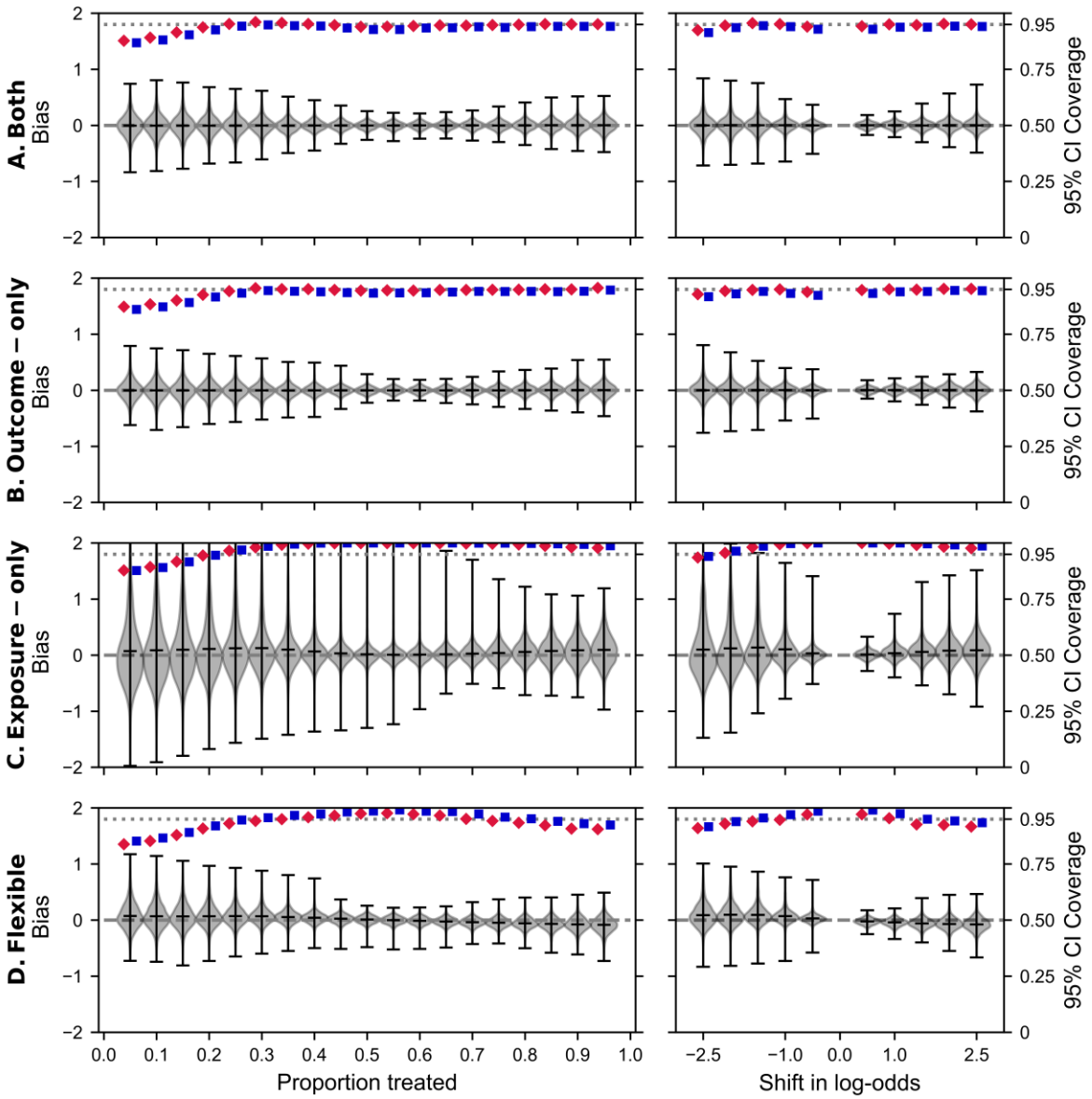

Figure C.19: Target maximum likelihood estimation for diet and body mass index, and the eX-FLU network unrestricted by degree.
Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of diet. The second column corresponds to the shift in log-odds of the predicted probability of diet for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

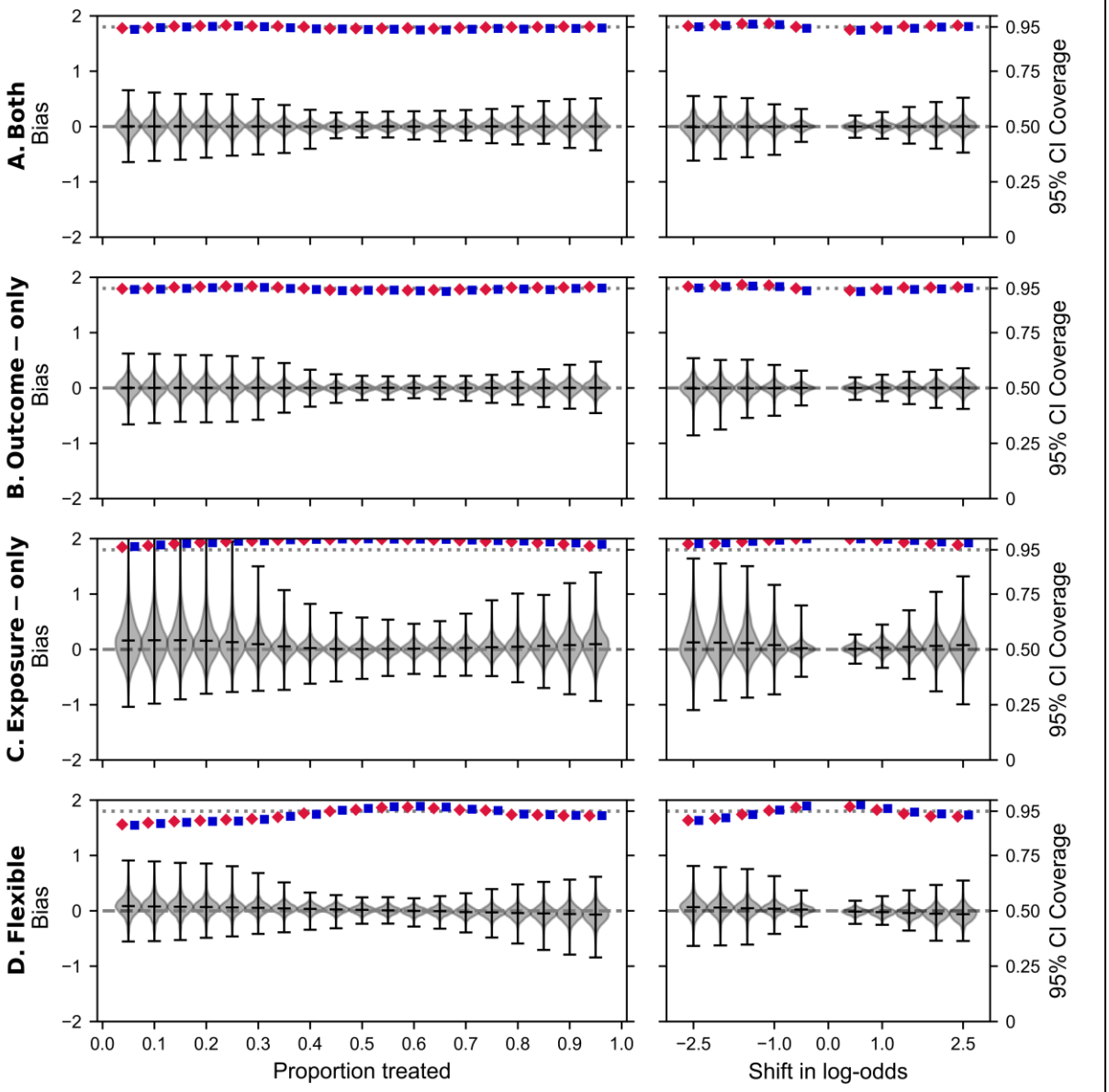

Figure C.20: Target maximum likelihood estimation for diet and body mass index, and the clustered power-law random graph ($n = 500$) restricted by degree.
The maximum degree for participants was restricted to be 18 or less. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of diet. The second column corresponds to the shift in log-odds of the predicted probability of diet for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

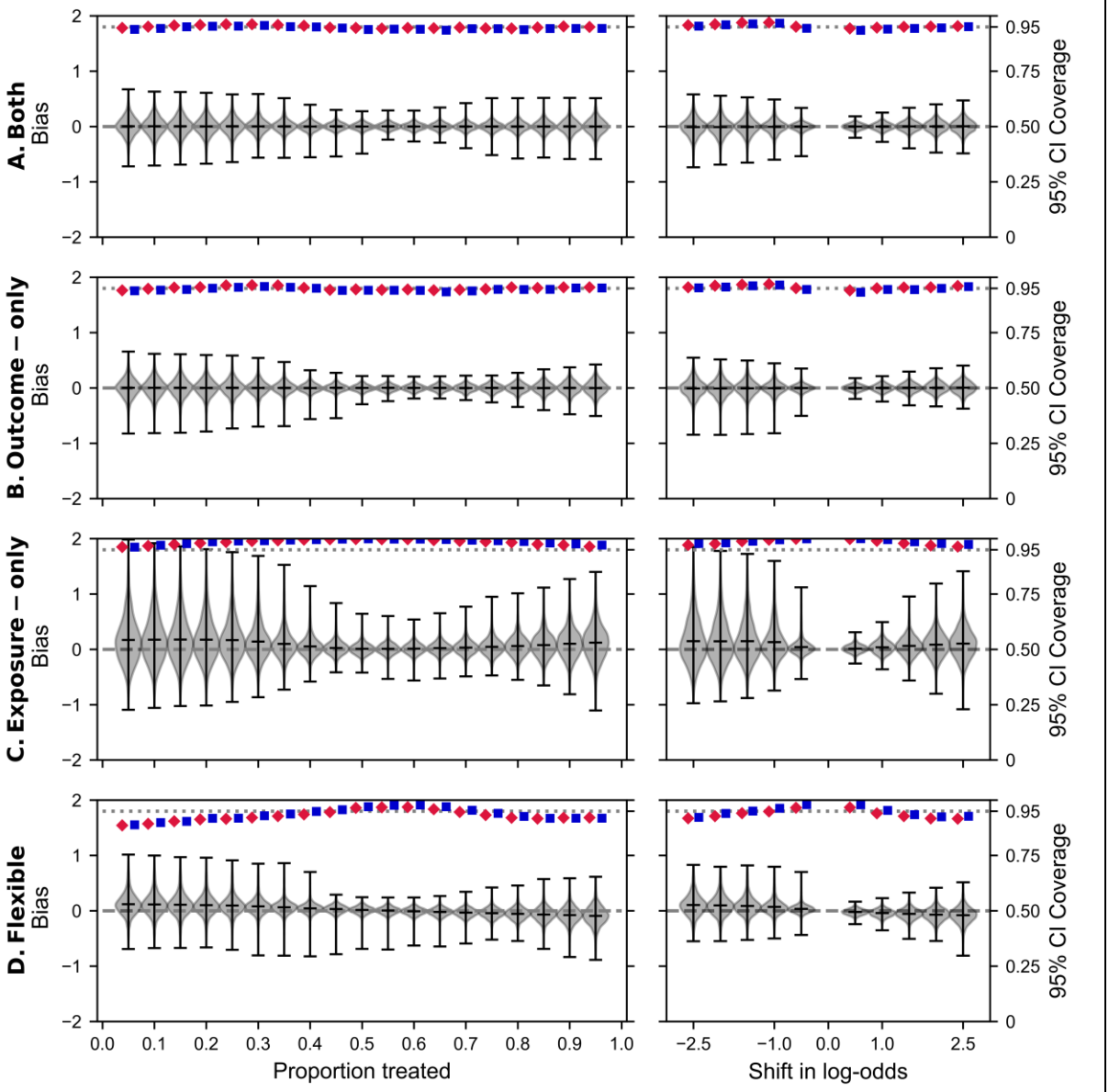

Figure C.21: Target maximum likelihood estimation for diet and body mass index, and the clustered power-law random graph ($n = 500$) unrestricted by degree.
Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of diet. The second column corresponds to the shift in log-odds of the predicted probability of diet for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

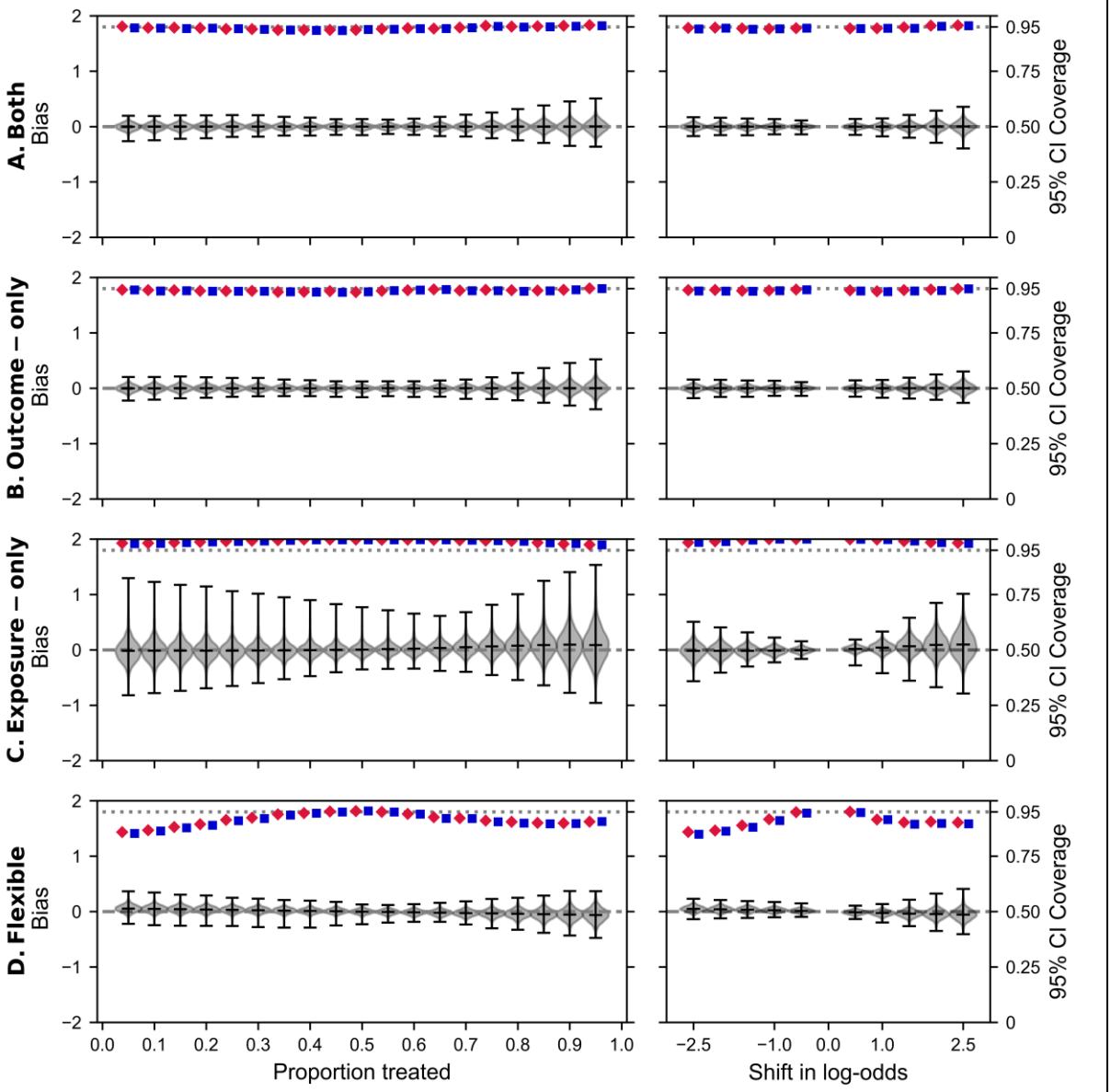

Figure C.22: Target maximum likelihood estimation for diet and body mass index, and the uniform random graph ($n = 1000$).

Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of diet. The second column corresponds to the shift in log-odds of the predicted probability of diet for each individual.

A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

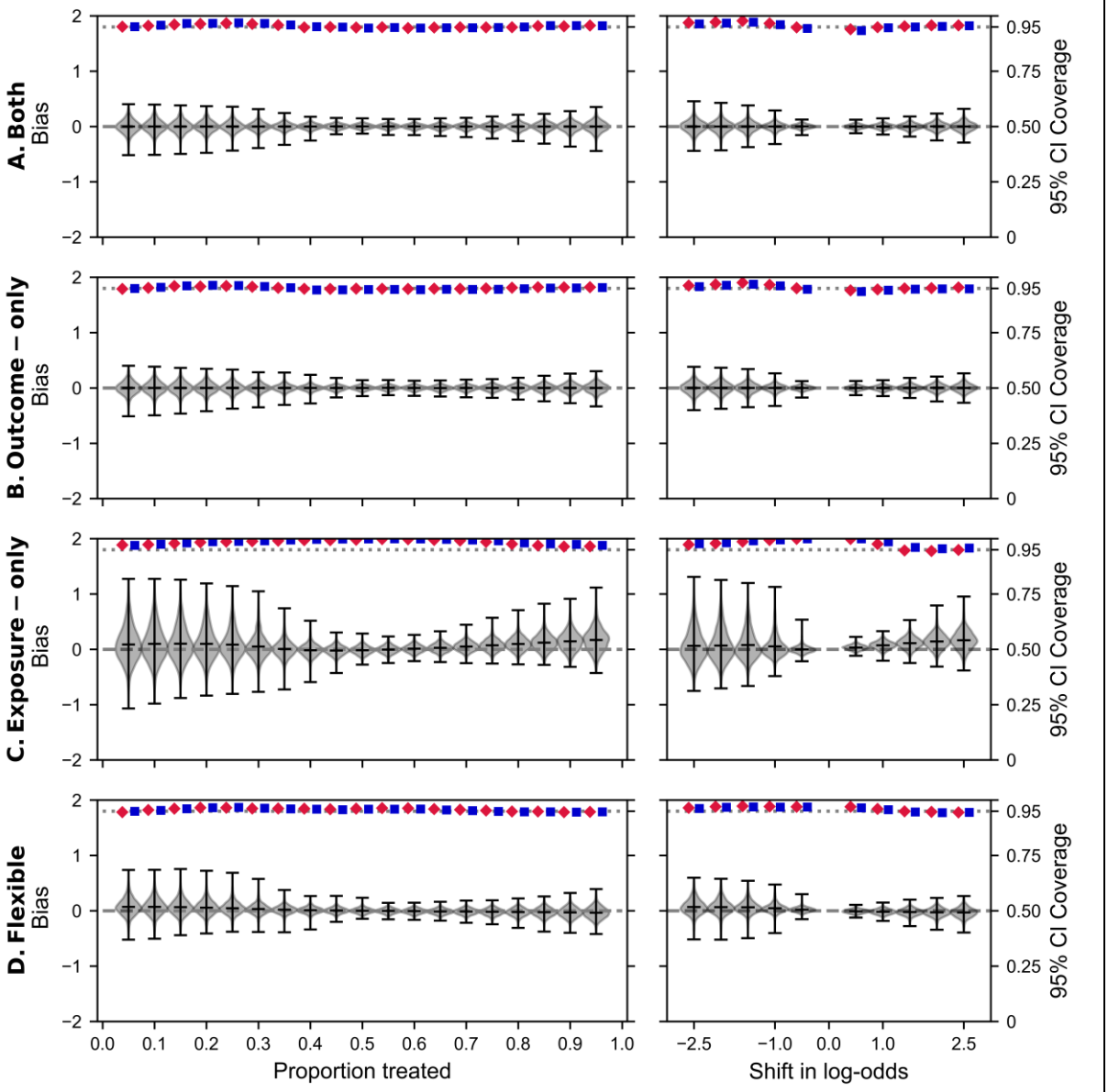

Figure C.23: Target maximum likelihood estimation for diet and body mass index, and the clustered power-law random graph ($n = 1000$) restricted by degree.
The maximum degree for participants was restricted to be 22 or less. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of diet. The second column corresponds to the shift in log-odds of the predicted probability of diet for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

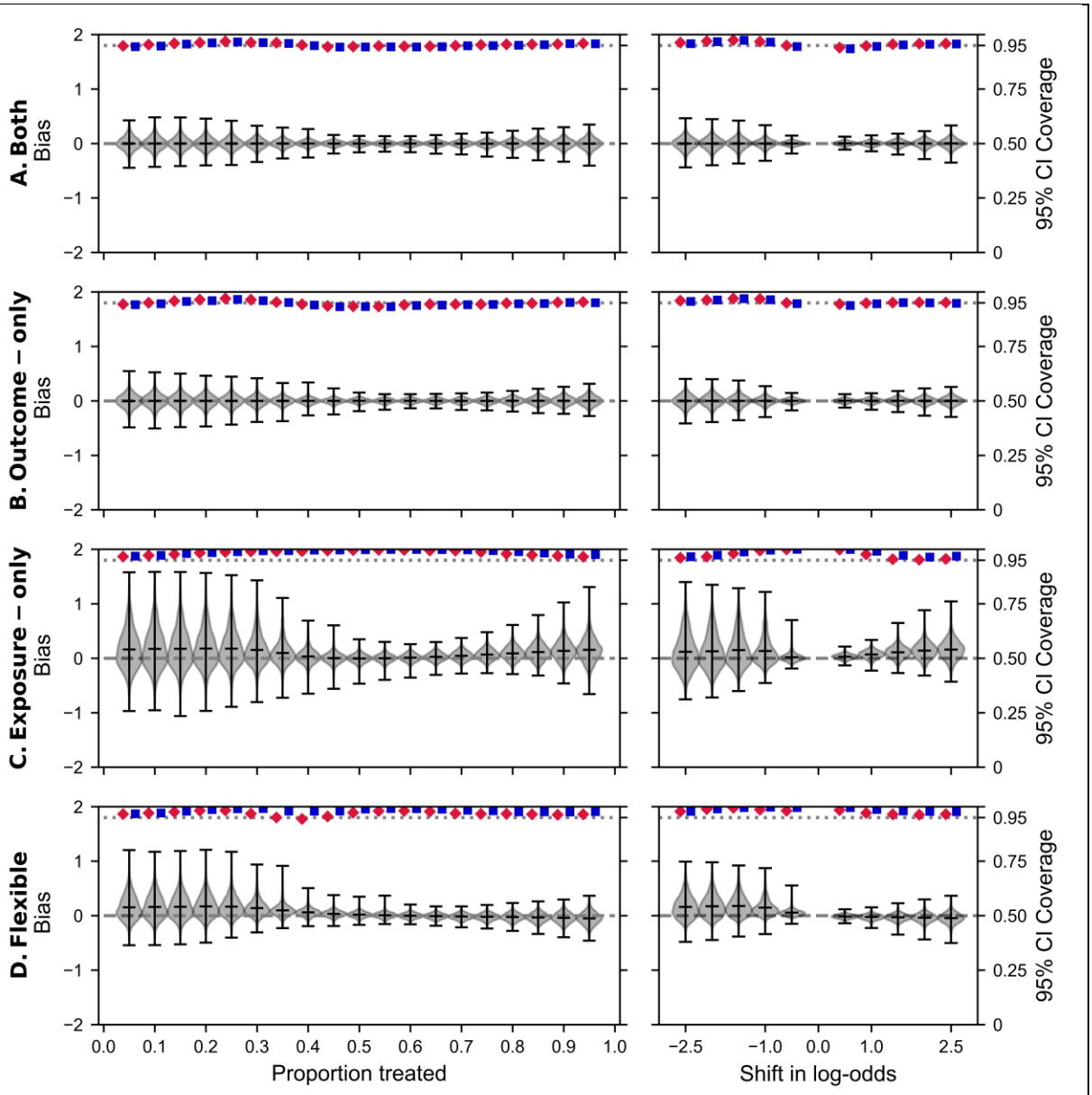

Figure C.24: Target maximum likelihood estimation for diet and body mass index, and the clustered power-law random graph ($n = 1000$) unrestricted by degree.
Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of diet. The second column corresponds to the shift in log-odds of the predicted probability of diet for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

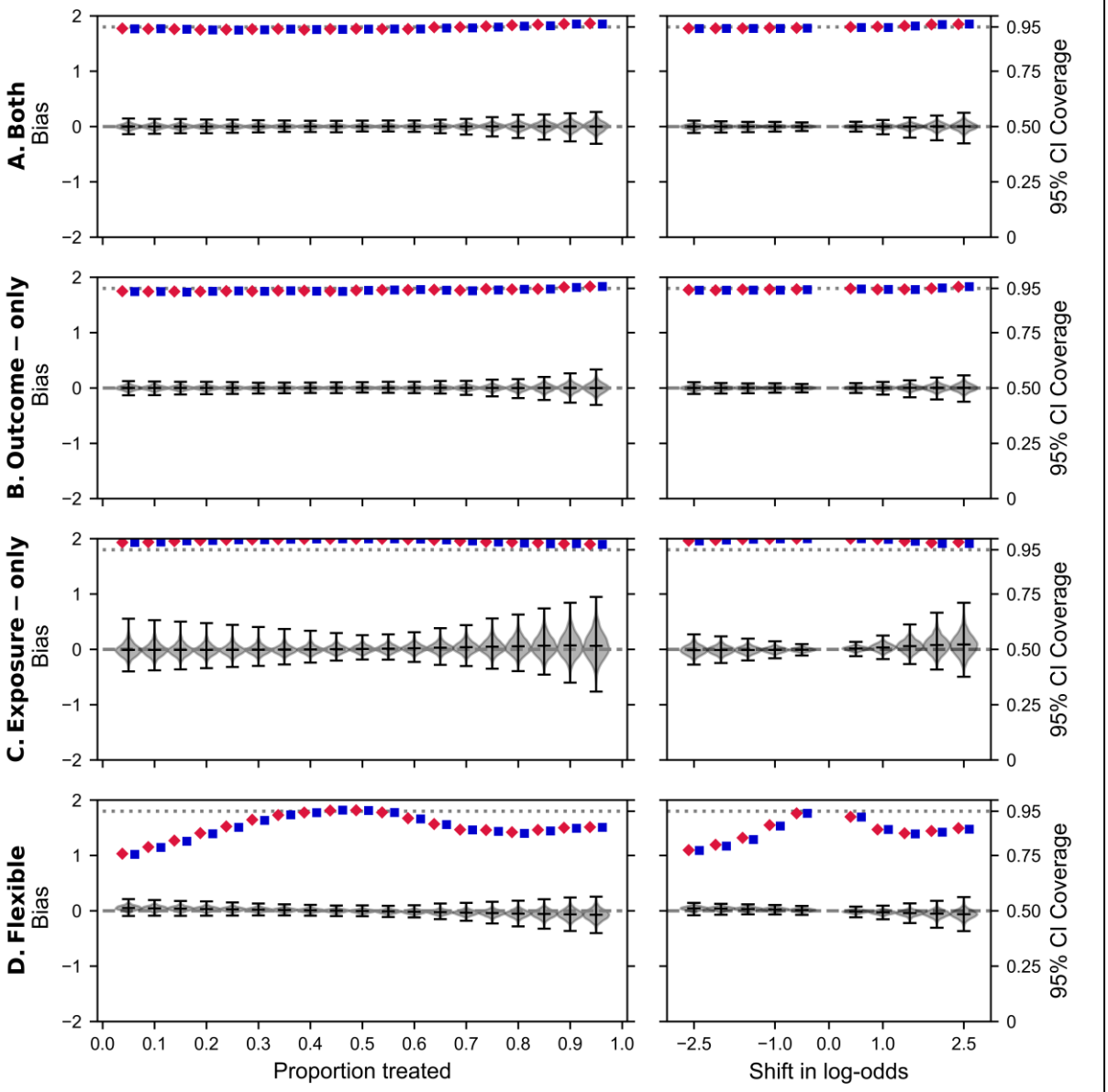

Figure C.25: Target maximum likelihood estimation for diet and body mass index, and the uniform random graph ($n = 2000$).
Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of diet. The second column corresponds to the shift in log-odds of the predicted probability of diet for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

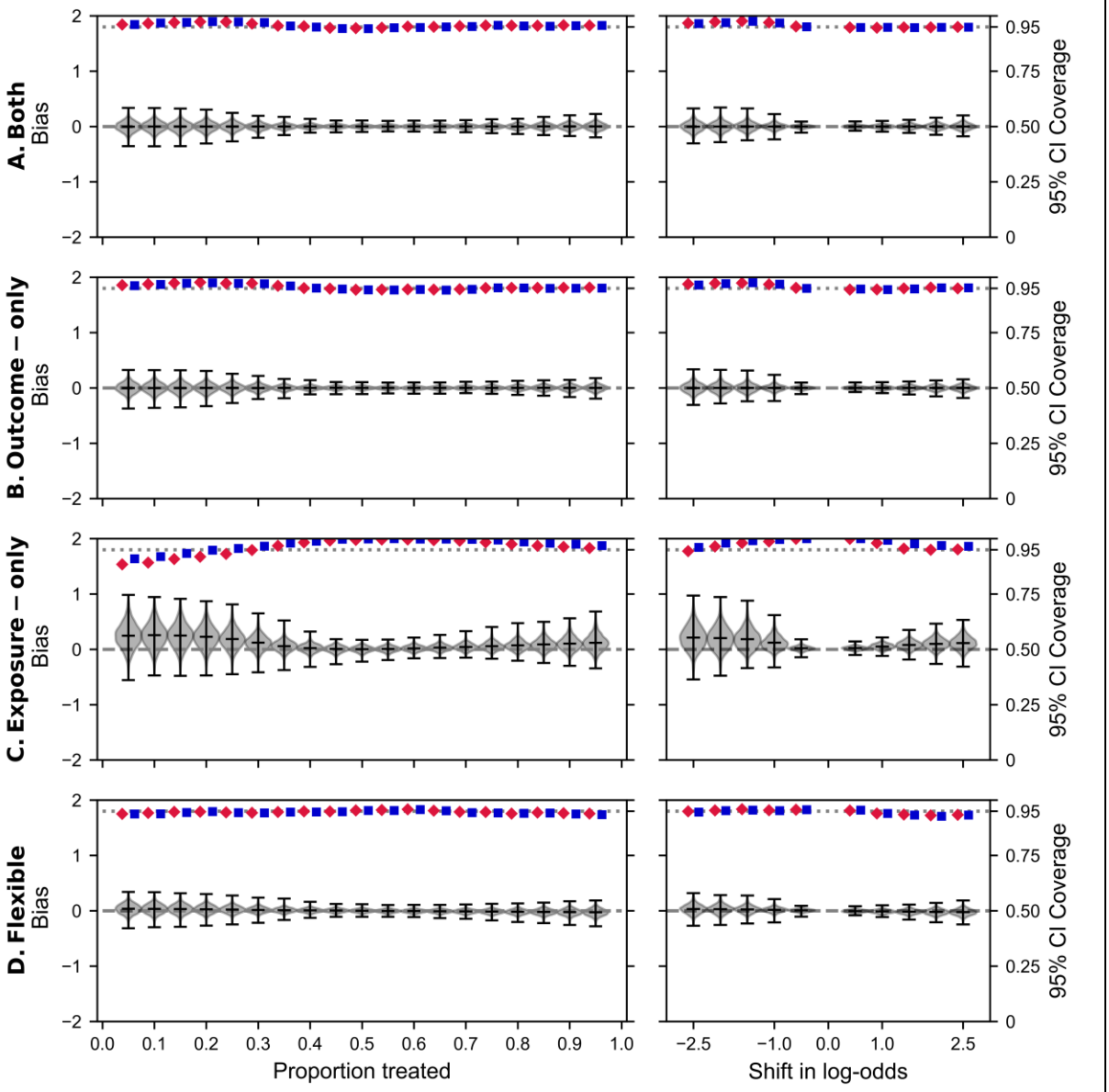

Figure C.26: Target maximum likelihood estimation for diet and body mass index, and the clustered power-law random graph ($n = 2000$) restricted by degree.

The maximum degree for participants was restricted to be 22 or less. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of diet. The second column corresponds to the shift in log-odds of the predicted probability of diet for each individual.

A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

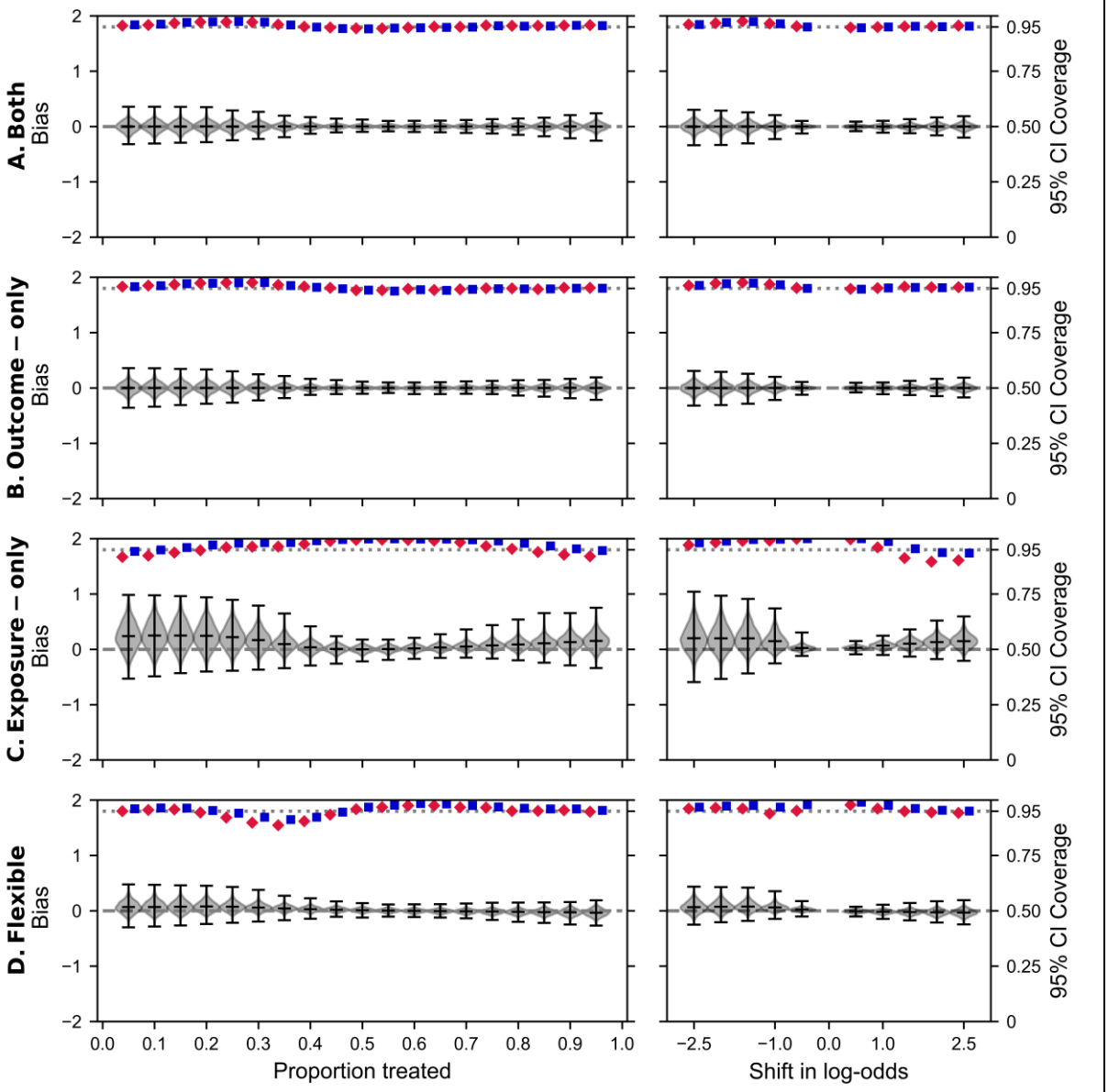

Figure C.27: Target maximum likelihood estimation for diet and body mass index, and the clustered power-law random graph ($n = 2000$) unrestricted by degree.
Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of diet. The second column corresponds to the shift in log-odds of the predicted probability of diet for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

Vaccine and infection

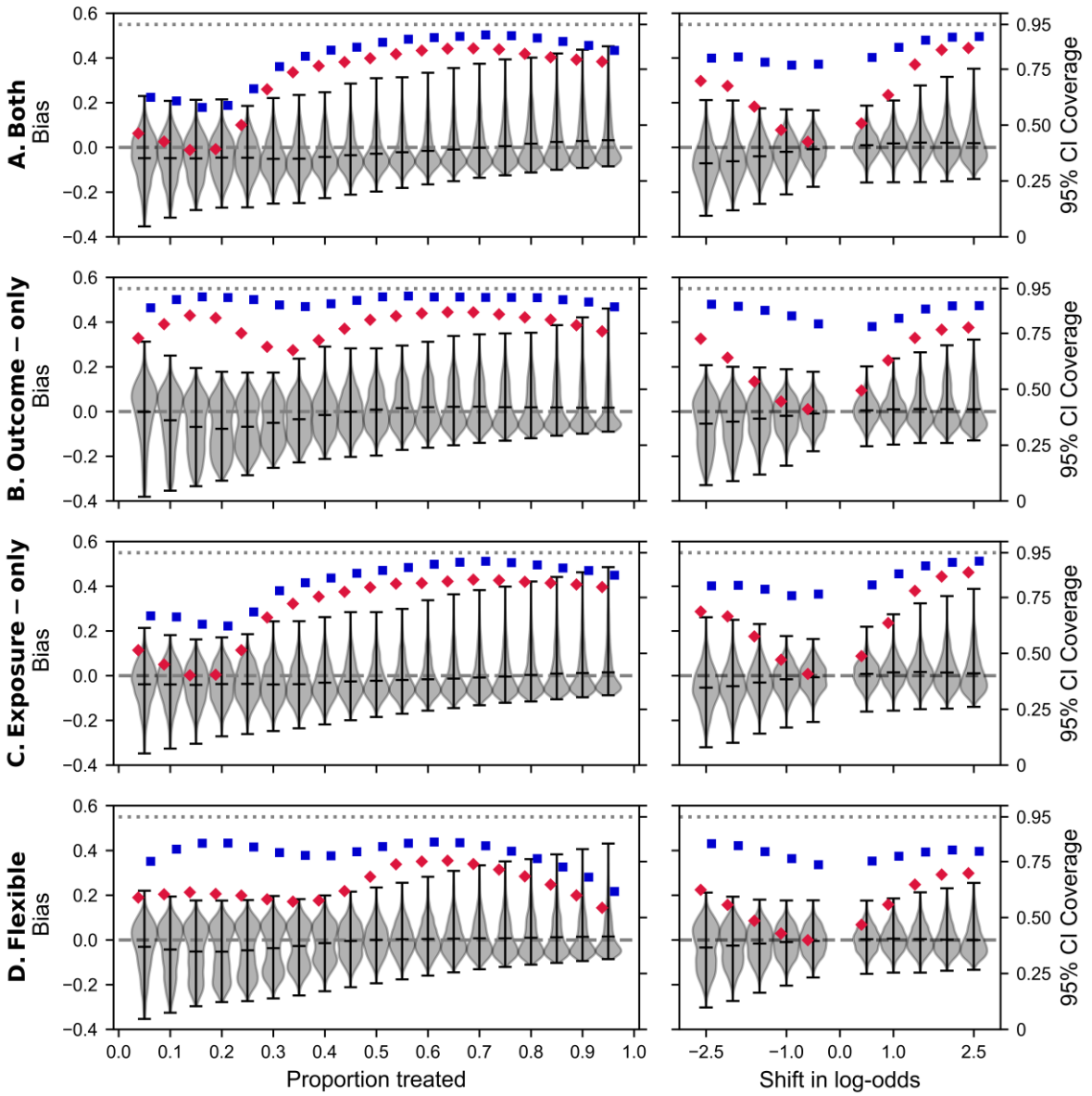

Figure C.28: Target maximum likelihood estimation for vaccination and infection, and the eX-FLU network unrestricted by degree.

Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of vaccination. The second column corresponds to the shift in log-odds of the predicted probability of vaccination for each individual.

A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

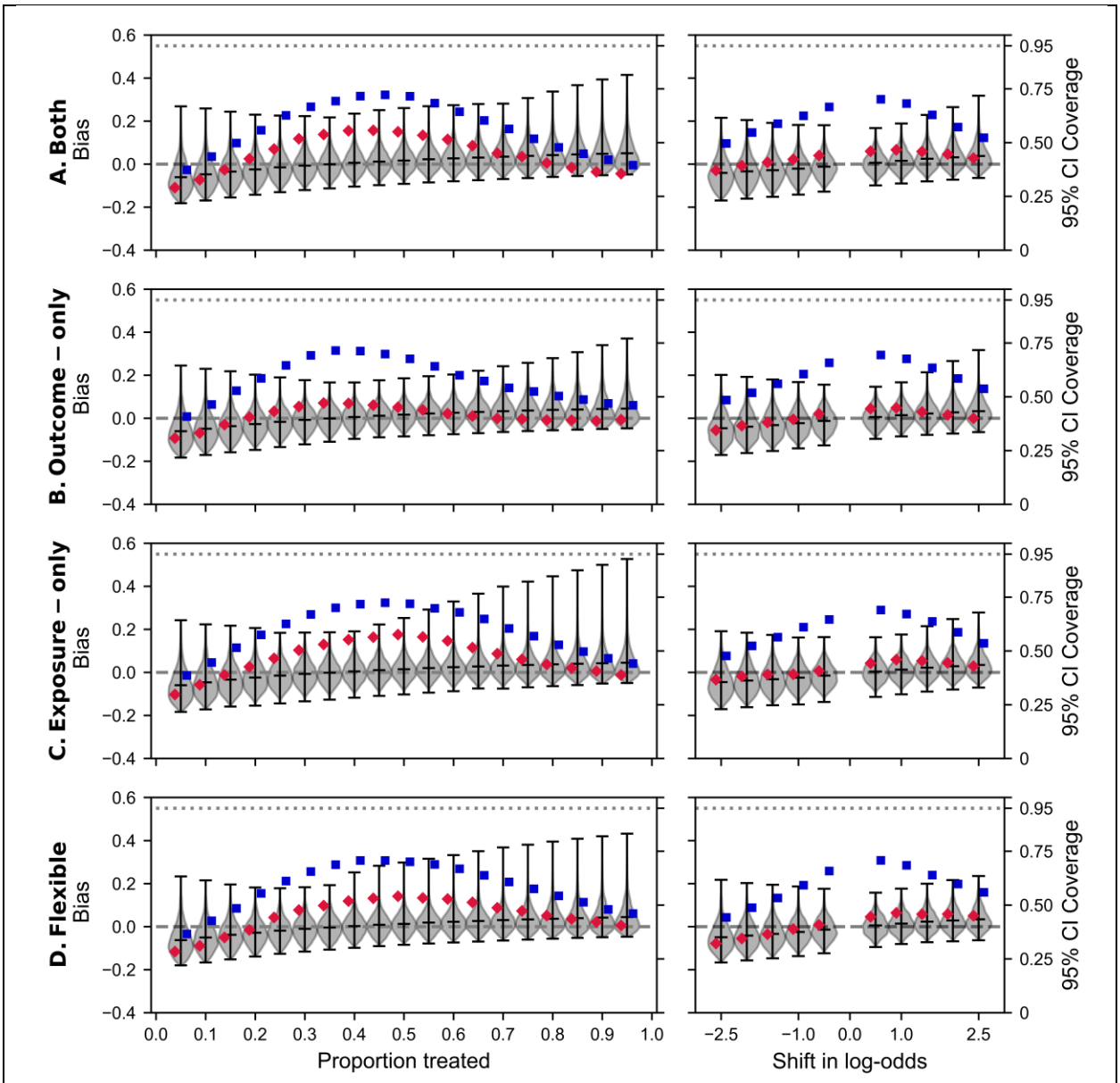

Figure C.29: Target maximum likelihood estimation for vaccination and infection, and the clustered power-law random graph ($n = 500$) restricted by degree.
The maximum degree for participants was restricted to be 18 or less. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of vaccination. The second column corresponds to the shift in log-odds of the predicted probability of vaccination for each individual. A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

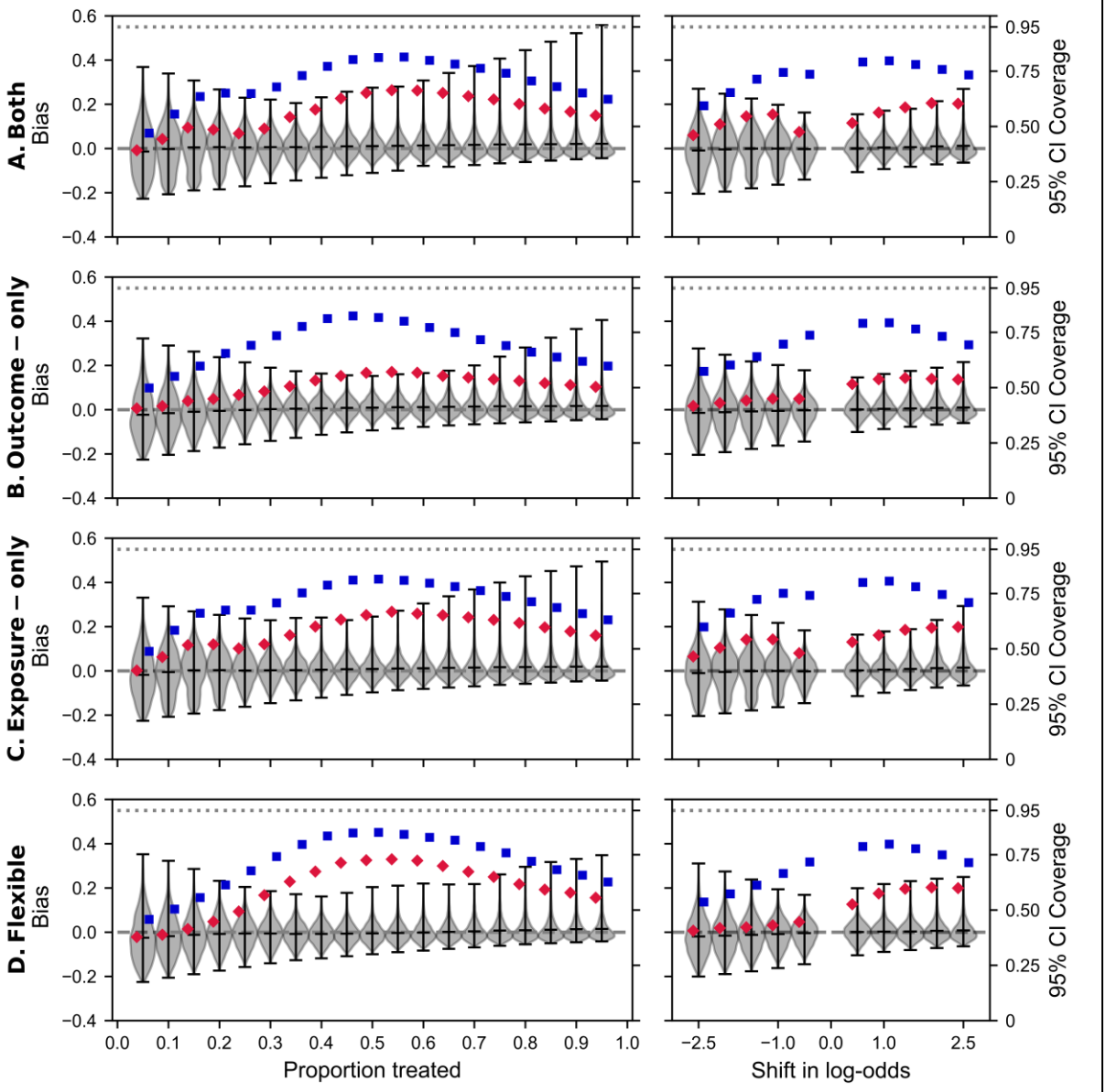

Figure C.30: Target maximum likelihood estimation for vaccination and infection, and the clustered power-law random graph ($n = 500$) unrestricted by degree.
Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of vaccination. The second column corresponds to the shift in log-odds of the predicted probability of vaccination for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

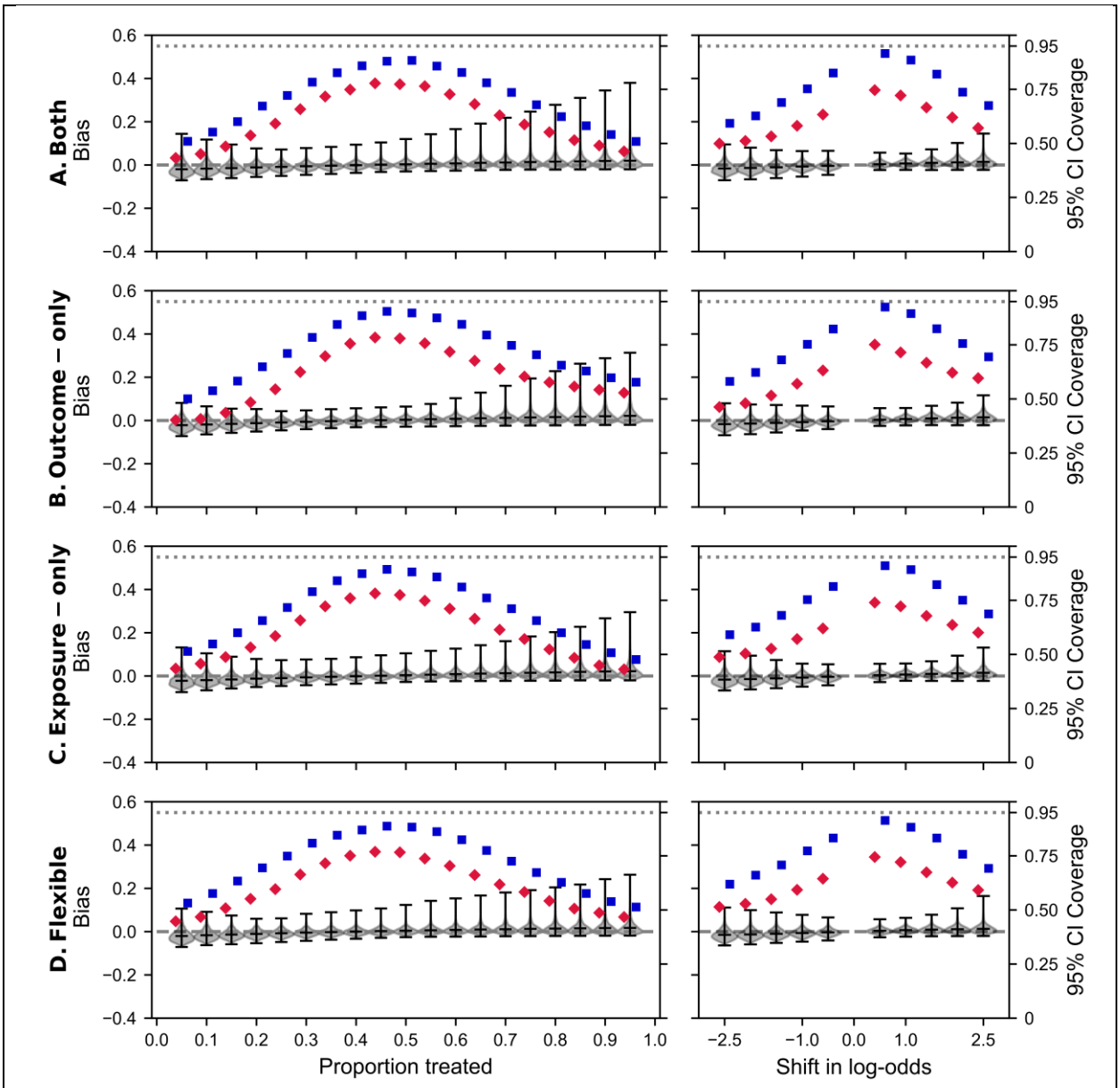

Figure C.31: Target maximum likelihood estimation for vaccination and infection, and the uniform random graph ($n = 1000$).

Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of vaccination. The second column corresponds to the shift in log-odds of the predicted probability of vaccination for each individual.

A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

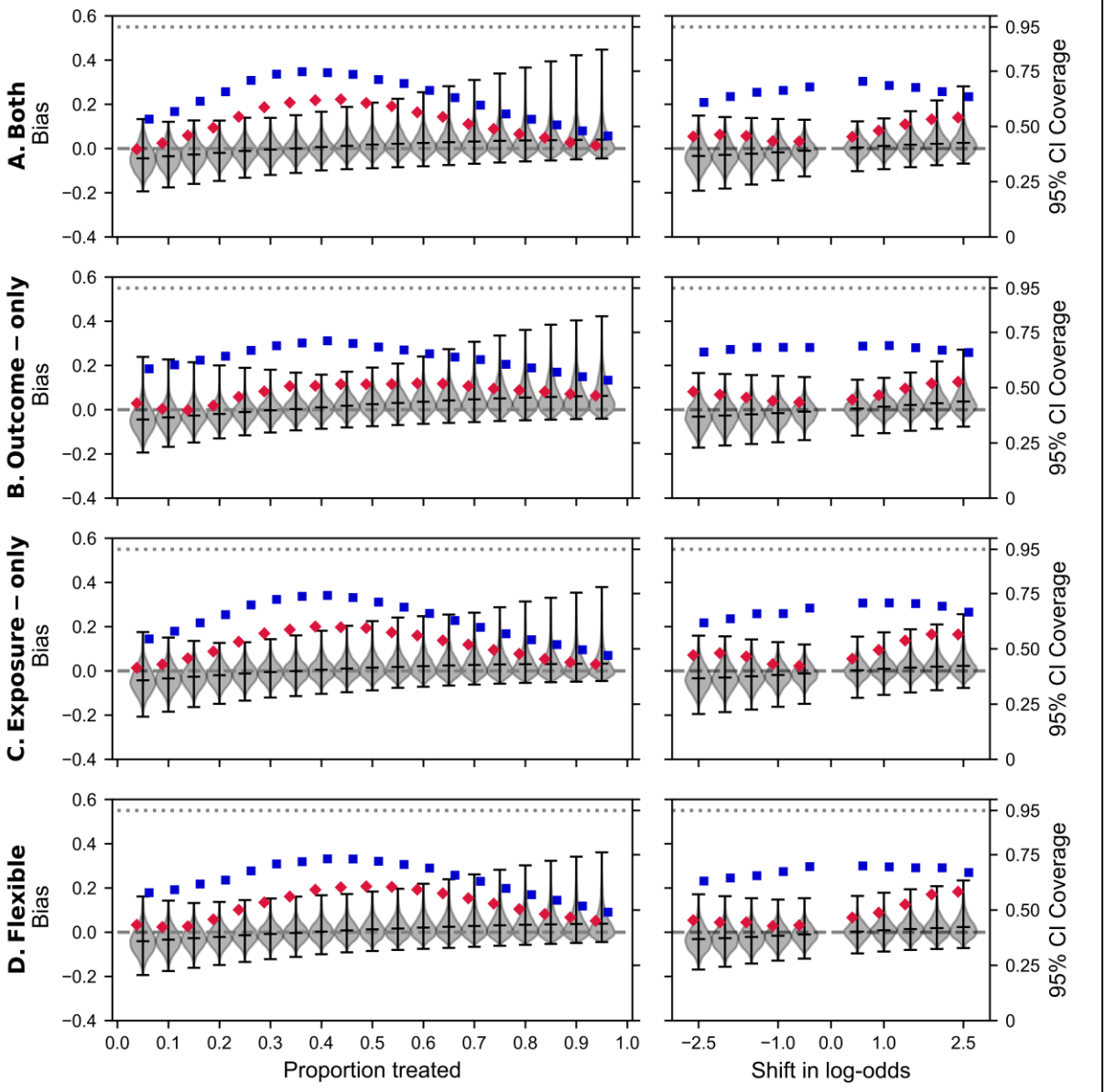

Figure C.32: Target maximum likelihood estimation for vaccination and infection, and the clustered power-law random graph ($n = 1000$) restricted by degree.
The maximum degree for participants was restricted to be 22 or less. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of vaccination. The second column corresponds to the shift in log-odds of the predicted probability of vaccination for each individual. A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

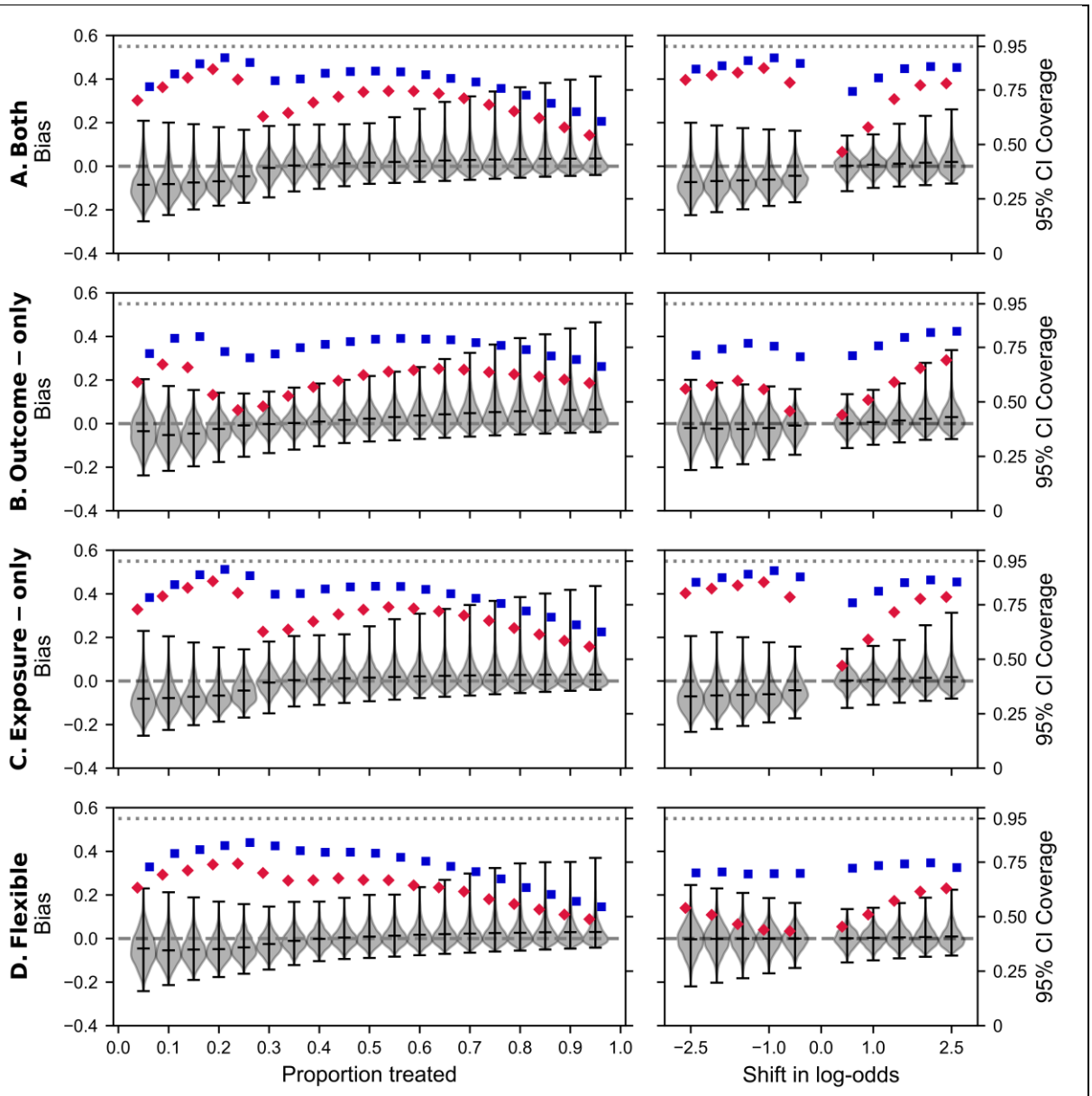

Figure C.33: Target maximum likelihood estimation for vaccination and infection, and the clustered power-law random graph ($n = 1000$) unrestricted by degree.
Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of vaccination. The second column corresponds to the shift in log-odds of the predicted probability of vaccination for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

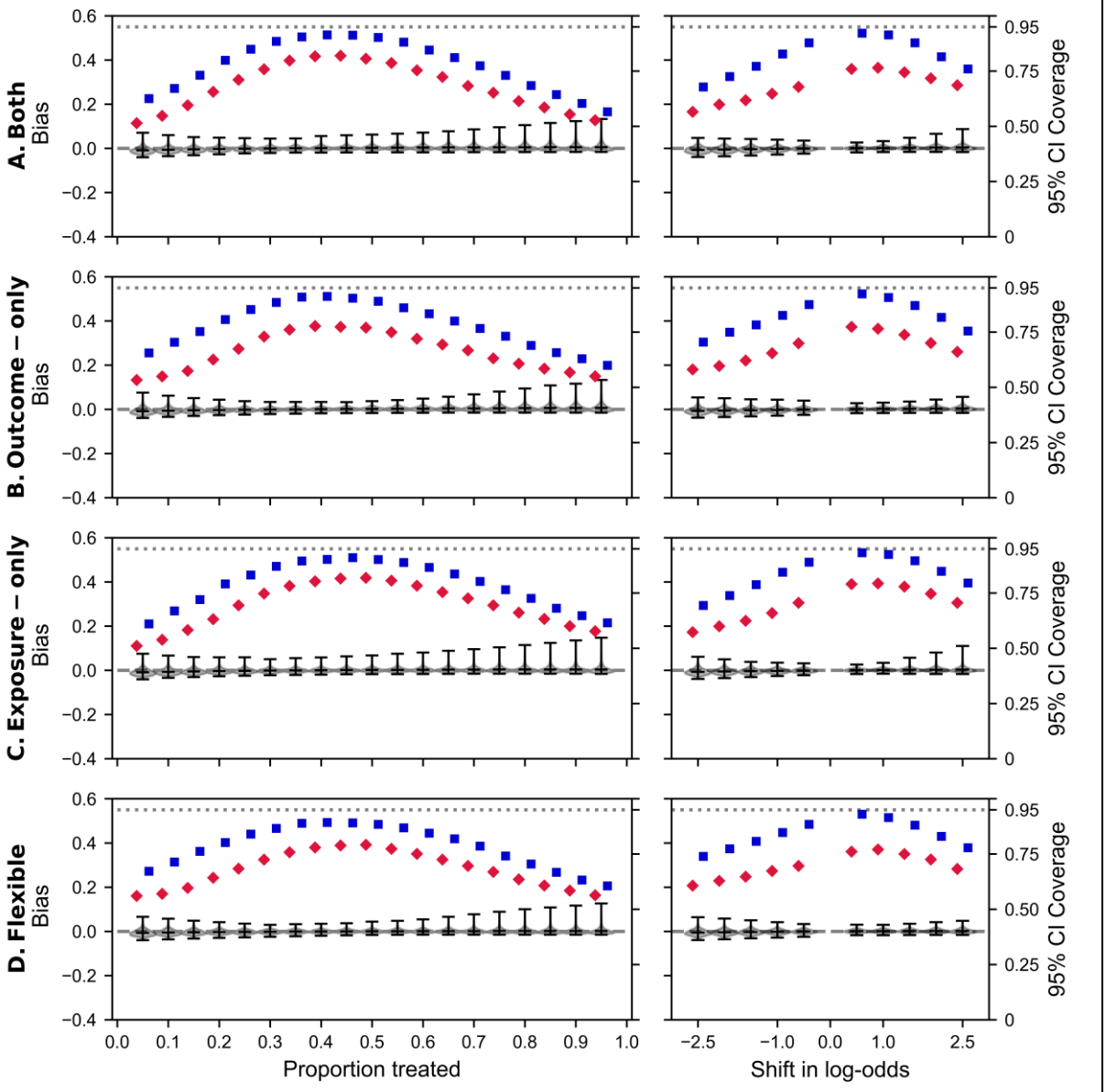

Figure C.34: Target maximum likelihood estimation for vaccination and infection, and the uniform random graph ($n = 2000$).

Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of vaccination. The second column corresponds to the shift in log-odds of the predicted probability of vaccination for each individual.

A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

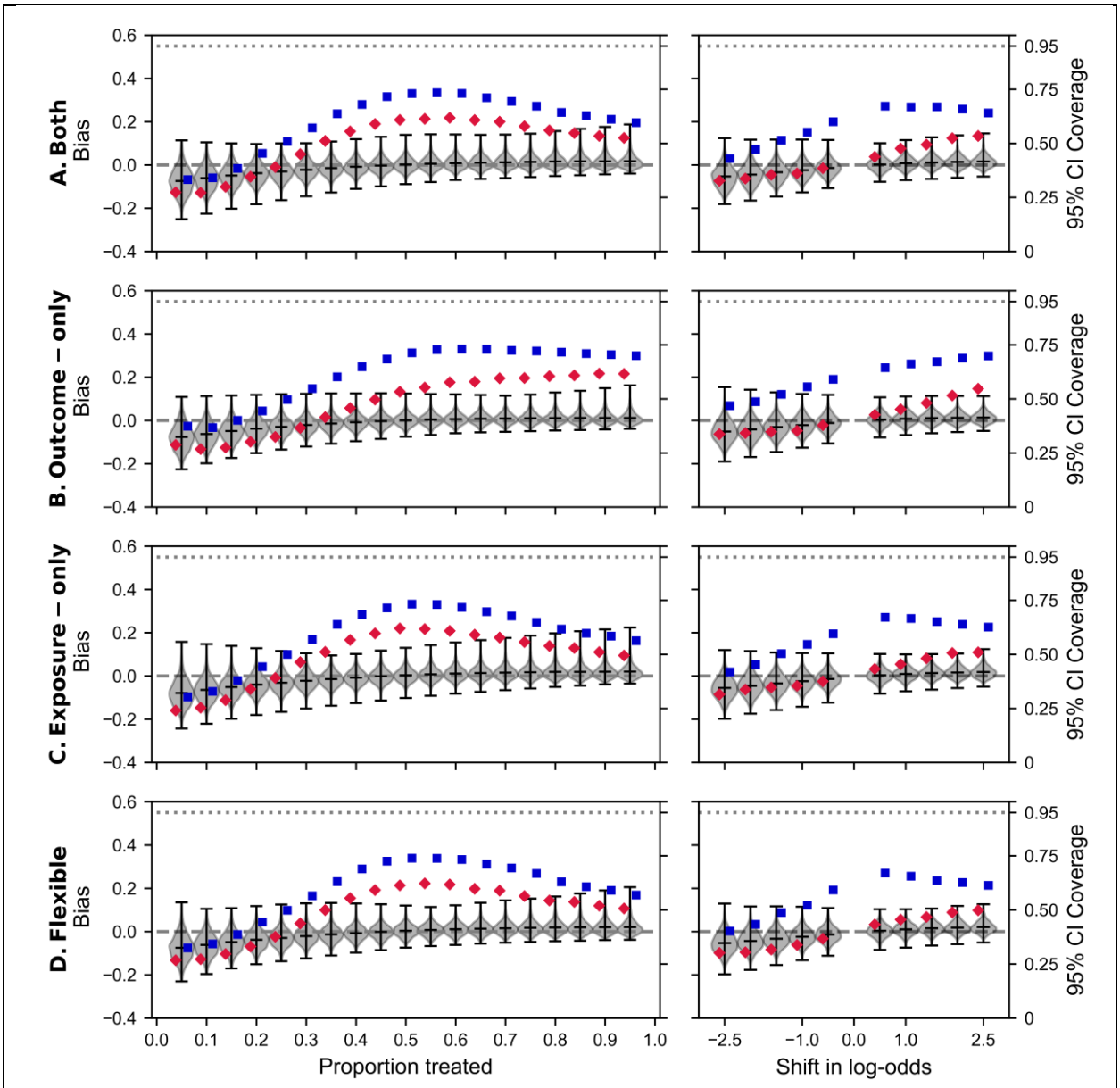

Figure C.35: Target maximum likelihood estimation for vaccination and infection, and the clustered power-law random graph ($n = 2000$) restricted by degree.
The maximum degree for participants was restricted to be 22 or less. Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of vaccination. The second column corresponds to the shift in log-odds of the predicted probability of vaccination for each individual. A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

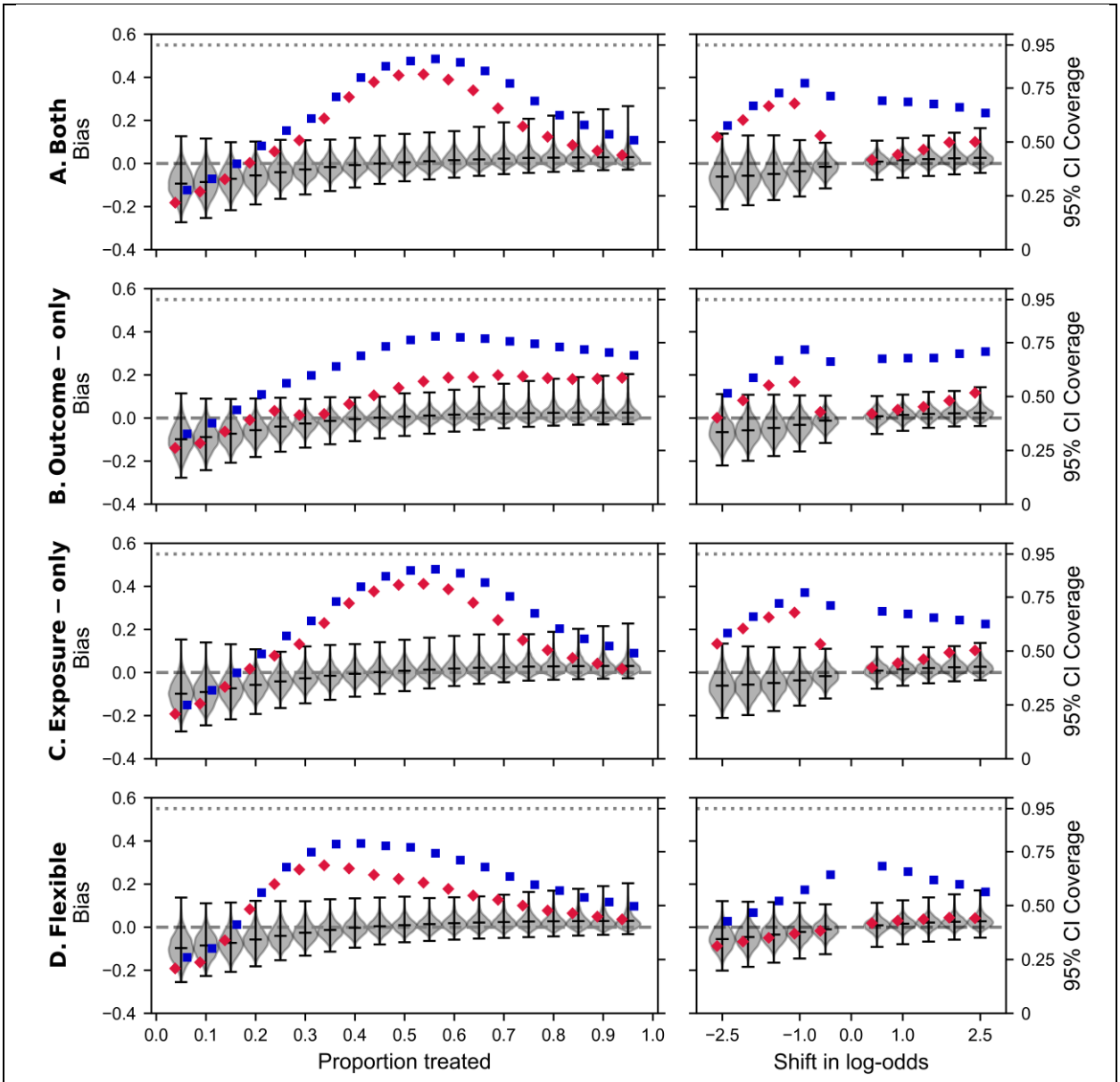

Figure C.36: Target maximum likelihood estimation for vaccination and infection, and the clustered power-law random graph ($n = 2000$) unrestricted by degree.
Left y-axes and violin plots correspond to bias, defined as the estimated conditional sample mean minus the true conditional sample mean. The right y-axes and diamonds correspond to 95% confidence interval (CI) coverage. The red diamond corresponds to the direct-transmission-only variance estimator and the blue square corresponds to the latent-variable-dependence variance estimators. The first column corresponds to all individuals in the population having the same set probability of vaccination. The second column corresponds to the shift in log-odds of the predicted probability of vaccination for each individual.
A: Network-TMLE with both nuisance models correctly specified. B: Network-TMLE with the exposure model misspecified. C: Network-TMLE with the outcome model misspecified. D: Network-TMLE with a flexible specification of W^s.

Appendix D: Simulation results in tabular format

Statin and cardiovascular disease

Table D.1: Network-TMLE for statins and atherosclerotic heart disease, and the uniform random graph ($n = 500$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.001	0.032	94.6%	94.6%	0	0	0.001	0.033	94.2%	94.1%	0	0
0.10	0.001	0.027	94.8%	94.5%	0	0	0.001	0.028	94.3%	94.0%	0	0
0.15	0.001	0.024	95.2%	95.1%	0	0	0.000	0.025	94.2%	94.3%	0	0
0.20	0.000	0.023	95.2%	95.1%	0	0	0.000	0.023	94.6%	94.7%	0	0
0.25	0.001	0.023	94.9%	94.9%	0	0	0.001	0.023	94.9%	94.5%	0	0
0.30	0.001	0.024	94.6%	94.5%	0	0	0.001	0.024	94.8%	94.8%	0	0
0.35	0.000	0.026	93.6%	93.3%	0	0	0.000	0.026	94.4%	94.0%	0	0
0.40	0.001	0.029	92.7%	92.0%	0	0	0.000	0.029	93.5%	93.0%	0	0
0.45	0.000	0.034	91.0%	90.8%	0	0	-0.001	0.033	92.0%	91.4%	0	0
0.50	0.001	0.039	89.7%	89.4%	0	0	-0.001	0.039	90.4%	89.7%	0	0
0.55	0.001	0.046	88.1%	87.7%	0	0	-0.001	0.045	89.0%	88.5%	0	0
0.60	0.001	0.052	86.4%	86.2%	0	0	-0.001	0.051	87.4%	87.0%	0	0
0.65	0.001	0.060	84.5%	84.2%	0	0	-0.001	0.059	86.2%	85.2%	0	0
0.70	0.001	0.067	82.5%	82.4%	0	0	-0.002	0.066	84.2%	83.0%	0	0
0.75	0.001	0.075	80.4%	80.2%	0	0	-0.002	0.074	82.3%	81.1%	0	0
0.80	0.001	0.083	78.3%	77.6%	0	0	-0.002	0.082	79.8%	79.1%	0	0
0.85	0.002	0.091	76.1%	76.0%	0	0	-0.001	0.090	77.0%	76.5%	0	0
0.90	0.003	0.100	73.5%	72.9%	0	0	-0.001	0.099	73.5%	73.7%	0	0
0.95	0.003	0.109	70.4%	70.3%	0	0	-0.001	0.108	70.2%	70.1%	1	1
Shift in log-odds												
-2.5	0.001	0.034	94.5%	94.3%	0	0	0.001	0.036	93.1%	92.6%	0	0
-2.0	0.001	0.032	94.9%	94.4%	0	0	0.001	0.033	93.2%	92.7%	0	0
-1.5	0.001	0.029	95.1%	94.8%	0	0	0.001	0.030	93.7%	93.3%	0	0
-1.0	0.001	0.025	95.4%	95.1%	0	0	0.000	0.026	94.2%	93.9%	0	0
-0.5	0.001	0.023	95.4%	95.2%	0	0	0.001	0.023	94.5%	94.2%	0	0
0.5	0.000	0.024	94.3%	94.1%	0	0	0.001	0.024	93.4%	93.6%	0	0
1.0	0.000	0.030	92.5%	91.8%	0	0	0.000	0.030	90.8%	90.1%	0	0
1.5	0.000	0.042	89.1%	88.8%	0	0	0.000	0.041	86.6%	85.8%	0	0
2.0	0.000	0.056	85.8%	84.0%	0	0	0.000	0.054	81.3%	80.3%	0	0
2.5	0.000	0.071	81.9%	80.6%	0	0	0.001	0.068	75.9%	75.2%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.2: Network-TMLE for statins and atherosclerotic heart disease, and the uniform random graph ($n = 1000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.000	0.023	94.3%	94.4%	0	0	0.000	0.025	92.6%	92.3%	0	0
0.10	0.000	0.020	94.3%	94.2%	0	0	0.000	0.021	93.2%	93.1%	0	0
0.15	0.000	0.018	94.4%	94.1%	0	0	0.000	0.018	94.1%	93.9%	0	0
0.20	0.000	0.016	94.7%	94.5%	0	0	0.000	0.017	94.4%	94.1%	0	0
0.25	0.000	0.016	94.6%	94.5%	0	0	0.000	0.017	94.0%	94.0%	0	0
0.30	0.000	0.017	94.5%	94.1%	0	0	0.000	0.017	93.4%	93.3%	0	0
0.35	-0.001	0.018	93.7%	93.5%	0	0	0.000	0.019	92.4%	92.3%	0	0
0.40	-0.001	0.021	93.2%	93.0%	0	0	0.000	0.021	90.9%	90.8%	0	0
0.45	-0.001	0.024	92.7%	92.4%	0	0	0.000	0.024	89.8%	89.0%	0	0
0.50	-0.001	0.028	91.6%	91.3%	0	0	0.000	0.028	87.7%	87.1%	0	0
0.55	-0.001	0.032	90.2%	89.8%	0	0	0.000	0.032	85.7%	85.5%	0	0
0.60	-0.002	0.037	89.1%	89.0%	0	0	0.000	0.037	84.0%	83.8%	0	0
0.65	-0.002	0.042	87.7%	88.0%	0	0	0.000	0.042	82.8%	82.4%	0	0
0.70	-0.002	0.048	86.2%	86.2%	0	0	0.000	0.047	80.6%	80.1%	0	0
0.75	-0.002	0.054	84.5%	84.3%	0	0	0.001	0.053	78.3%	77.4%	0	0
0.80	-0.002	0.060	82.6%	82.2%	0	0	0.001	0.059	75.7%	75.0%	0	0
0.85	-0.002	0.066	79.9%	79.6%	0	0	0.001	0.065	73.2%	72.7%	0	0
0.90	-0.002	0.073	77.6%	76.8%	0	0	0.001	0.071	70.8%	70.4%	0	0
0.95	-0.002	0.079	75.2%	74.2%	0	0	0.002	0.078	68.3%	67.8%	0	0
Shift in log-odds												
-2.5	0.001	0.024	94.6%	94.6%	0	0	0.000	0.026	92.4%	91.9%	0	0
-2.0	0.001	0.023	94.5%	94.4%	0	0	0.000	0.024	92.6%	92.5%	0	0
-1.5	0.000	0.021	94.6%	94.5%	0	0	0.000	0.021	92.8%	93.0%	0	0
-1.0	0.000	0.018	94.9%	94.9%	0	0	0.000	0.019	93.2%	93.0%	0	0
-0.5	0.000	0.016	94.8%	94.5%	0	0	0.000	0.016	94.3%	94.4%	0	0
0.5	0.000	0.016	94.4%	93.8%	0	0	0.000	0.016	94.4%	94.2%	0	0
1.0	0.000	0.021	93.4%	93.0%	0	0	0.000	0.021	91.6%	90.7%	0	0
1.5	0.000	0.029	91.6%	91.2%	0	0	0.001	0.028	88.5%	88.0%	0	0
2.0	0.000	0.040	89.7%	89.3%	0	0	0.001	0.038	84.5%	84.3%	0	0
2.5	0.000	0.051	87.0%	86.3%	0	0	0.002	0.048	80.7%	80.3%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.3: Network-TMLE for statins and atherosclerotic heart disease, and the uniform random graph ($n = 2000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.000	0.016	95.5%	95.5%	0	0	0.000	0.017	93.9%	93.9%	0	0
0.10	0.000	0.014	95.0%	95.1%	0	0	0.000	0.015	93.8%	93.8%	0	0
0.15	0.000	0.012	94.9%	94.8%	0	0	0.000	0.013	94.3%	94.1%	0	0
0.20	0.000	0.012	94.8%	94.7%	0	0	0.000	0.012	94.5%	94.5%	0	0
0.25	0.000	0.011	94.8%	94.8%	0	0	0.000	0.012	94.4%	94.3%	0	0
0.30	0.000	0.012	94.7%	94.6%	0	0	0.000	0.012	94.0%	94.0%	0	0
0.35	0.000	0.013	94.4%	94.2%	0	0	0.000	0.013	93.4%	93.1%	0	0
0.40	0.000	0.014	93.6%	93.4%	0	0	0.000	0.015	92.3%	91.8%	0	0
0.45	0.000	0.016	92.7%	92.5%	0	0	0.000	0.017	89.9%	90.3%	0	0
0.50	0.000	0.019	91.9%	91.7%	0	0	0.000	0.019	89.0%	88.5%	0	0
0.55	0.000	0.023	91.1%	90.8%	0	0	0.000	0.022	87.5%	87.1%	0	0
0.60	0.000	0.026	90.4%	89.7%	0	0	0.000	0.025	86.1%	85.5%	0	0
0.65	0.000	0.030	89.1%	88.9%	0	0	0.000	0.028	84.4%	83.9%	0	0
0.70	0.000	0.034	87.9%	87.9%	0	0	0.000	0.032	82.5%	82.0%	0	0
0.75	0.000	0.038	86.7%	86.0%	0	0	0.000	0.036	81.0%	80.5%	0	0
0.80	0.000	0.042	85.3%	84.7%	0	0	0.000	0.040	79.1%	78.5%	0	0
0.85	0.000	0.047	83.5%	83.3%	0	0	0.000	0.044	77.3%	76.8%	0	0
0.90	0.000	0.051	81.7%	81.5%	0	0	0.000	0.048	75.0%	74.5%	0	0
0.95	0.000	0.056	79.4%	79.1%	0	0	0.000	0.053	72.7%	72.0%	0	0
Shift in log-odds												
-2.5	0.000	0.018	94.9%	94.8%	0	0	0.000	0.018	93.9%	94.0%	0	0
-2.0	0.000	0.016	94.9%	94.8%	0	0	0.000	0.017	93.8%	93.8%	0	0
-1.5	0.000	0.015	94.7%	94.6%	0	0	0.000	0.015	93.7%	93.7%	0	0
-1.0	0.000	0.013	94.7%	94.6%	0	0	0.000	0.013	94.0%	94.0%	0	0
-0.5	0.000	0.012	94.9%	94.7%	0	0	0.000	0.012	94.4%	94.4%	0	0
0.5	0.000	0.012	94.3%	94.4%	0	0	0.000	0.012	94.0%	94.0%	0	0
1.0	0.000	0.015	93.3%	93.3%	0	0	0.000	0.015	91.8%	91.6%	0	0
1.5	0.000	0.021	91.6%	91.4%	0	0	0.000	0.020	88.4%	88.0%	0	0
2.0	0.000	0.029	89.8%	89.8%	0	0	0.000	0.027	85.0%	84.8%	0	0
2.5	0.000	0.037	87.3%	87.2%	0	0	0.000	0.035	81.3%	81.0%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.4: Network-TMLE for statins and atherosclerotic heart disease, and the eX-FLU network restricted by degree ($n = 467$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.001	0.033	98.6%	98.5%	0	0	0.000	0.040	95.1%	94.3%	0	0
0.10	0.001	0.028	97.6%	97.6%	0	0	-0.001	0.033	95.1%	94.2%	0	0
0.15	0.001	0.026	96.7%	96.5%	0	0	-0.001	0.028	94.9%	94.0%	0	0
0.20	0.000	0.025	95.6%	94.9%	0	0	-0.001	0.027	94.7%	94.4%	0	0
0.25	0.001	0.025	95.2%	94.6%	0	0	-0.001	0.027	94.9%	94.3%	0	0
0.30	0.001	0.029	97.0%	95.8%	0	0	-0.002	0.029	94.8%	94.6%	0	0
0.35	0.000	0.036	98.9%	97.7%	0	2	-0.001	0.034	94.9%	94.4%	0	0
0.40	0.001	0.047	99.5%	98.7%	3	10	-0.002	0.040	94.4%	93.8%	0	0
0.45	0.001	0.056	99.7%	99.5%	17	41	-0.003	0.047	93.9%	93.3%	0	0
0.50	0.001	0.062	99.8%	99.7%	73	111	-0.003	0.055	92.9%	92.5%	0	2
0.55	0.001	0.066	99.9%	99.8%	203	248	-0.004	0.063	92.1%	91.5%	0	5
0.60	0.001	0.069	100.0%	99.7%	407	388	-0.004	0.072	91.4%	91.1%	0	7
0.65	0.002	0.071	100.0%	99.9%	642	536	-0.005	0.080	90.4%	90.3%	0	8
0.70	0.002	0.073	100.0%	99.9%	814	648	-0.005	0.088	88.7%	89.2%	0	11
0.75	0.003	0.075	100.0%	99.9%	943	706	-0.005	0.095	87.0%	87.9%	0	10
0.80	0.003	0.078	100.0%	99.9%	981	722	-0.005	0.103	84.8%	85.6%	1	10
0.85	0.003	0.081	100.0%	99.8%	936	710	-0.004	0.111	81.6%	82.4%	2	11
0.90	0.004	0.087	100.0%	99.7%	802	619	-0.005	0.119	77.1%	77.7%	2	11
0.95	0.006	0.096	99.5%	99.6%	606	515	-0.005	0.129	72.2%	73.3%	2	11
Shift in log-odds												
-2.5	0.001	0.034	99.5%	99.2%	0	0	0.001	0.043	94.1%	93.7%	0	0
-2.0	0.001	0.032	99.2%	99.1%	0	0	0.001	0.040	94.3%	93.8%	0	0
-1.5	0.001	0.029	98.9%	98.8%	0	0	0.000	0.035	94.3%	94.1%	0	0
-1.0	0.000	0.026	98.5%	98.3%	0	0	0.000	0.030	94.6%	94.4%	0	0
-0.5	0.000	0.023	97.3%	97.2%	0	0	0.001	0.026	95.1%	94.4%	0	0
0.5	-0.001	0.029	98.7%	97.4%	0	0	0.000	0.029	94.5%	93.6%	0	0
1.0	-0.001	0.048	99.6%	99.3%	6	16	0.000	0.040	94.2%	93.0%	0	0
1.5	-0.003	0.064	99.9%	99.7%	144	184	-0.001	0.057	93.6%	92.5%	0	1
2.0	-0.003	0.071	100.0%	99.9%	565	457	-0.001	0.076	91.6%	90.8%	0	5
2.5	-0.002	0.075	100.0%	99.9%	915	670	-0.001	0.091	89.0%	88.3%	0	8

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained. The maximum degree for participants was restricted to be 22 or less.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.5: Network-TMLE for statins and atherosclerotic heart disease, and the eX-FLU network unrestricted ($n = 467$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.000	0.038	99.4%	99.2%	0	0	-0.001	0.053	93.3%	92.4%	0	1
0.10	0.000	0.030	98.4%	98.3%	0	0	-0.001	0.038	94.4%	93.6%	0	0
0.15	0.000	0.026	97.5%	97.2%	0	0	-0.001	0.030	94.7%	93.8%	0	0
0.20	0.000	0.024	95.9%	95.3%	0	0	-0.001	0.026	95.0%	94.4%	0	0
0.25	0.000	0.025	95.4%	94.4%	0	0	-0.001	0.026	94.9%	94.2%	0	0
0.30	0.000	0.032	97.9%	95.7%	0	0	-0.001	0.028	93.9%	93.2%	0	0
0.35	0.001	0.045	99.3%	97.5%	0	3	-0.001	0.033	92.3%	91.2%	0	0
0.40	0.002	0.059	99.7%	98.7%	11	37	-0.001	0.040	90.5%	89.5%	0	0
0.45	0.002	0.068	99.7%	99.4%	81	129	-0.001	0.048	88.0%	87.0%	0	1
0.50	0.002	0.073	99.8%	99.4%	259	265	-0.001	0.055	85.7%	83.9%	0	2
0.55	0.003	0.076	99.9%	99.6%	502	372	-0.001	0.063	82.8%	81.3%	0	4
0.60	0.003	0.080	99.9%	99.6%	685	470	-0.001	0.071	79.3%	78.2%	0	4
0.65	0.004	0.083	99.9%	99.5%	815	518	0.000	0.078	75.8%	75.0%	0	6
0.70	0.004	0.087	99.8%	99.4%	881	543	-0.001	0.085	71.9%	71.1%	0	7
0.75	0.005	0.092	99.5%	99.3%	870	541	0.000	0.093	67.8%	67.1%	0	6
0.80	0.006	0.097	99.3%	99.1%	825	523	0.000	0.101	64.4%	63.4%	0	5
0.85	0.007	0.103	98.7%	98.7%	745	482	0.001	0.109	59.9%	59.3%	0	5
0.90	0.008	0.110	97.8%	97.7%	607	439	0.001	0.117	55.1%	54.9%	0	4
0.95	0.010	0.120	95.7%	95.2%	447	369	0.001	0.126	51.3%	49.9%	0	1
Shift in log-odds												
-2.5	0.000	0.041	99.6%	99.6%	0	0	0.000	0.062	91.1%	90.8%	0	1
-2.0	0.001	0.038	99.5%	99.4%	0	0	0.000	0.054	91.8%	91.1%	0	1
-1.5	0.000	0.033	99.3%	99.0%	0	0	0.000	0.044	92.8%	92.2%	0	0
-1.0	0.000	0.028	99.0%	98.8%	0	0	0.000	0.034	93.6%	92.8%	0	0
-0.5	0.000	0.024	97.6%	97.6%	0	0	0.000	0.026	94.6%	94.1%	0	0
0.5	-0.001	0.033	98.5%	96.5%	0	0	0.000	0.028	93.2%	91.2%	0	0
1.0	0.000	0.061	99.9%	98.8%	30	56	0.000	0.042	89.5%	87.2%	0	0
1.5	-0.002	0.073	99.9%	99.5%	321	257	0.000	0.060	84.3%	82.7%	0	0
2.0	-0.001	0.079	99.9%	99.6%	717	444	0.000	0.077	77.9%	76.9%	0	1
2.5	0.000	0.087	99.7%	99.3%	828	501	0.000	0.092	70.8%	70.7%	0	1

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^S for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.6: Network-TMLE for statins and atherosclerotic heart disease, and the clustered power-law random graph restricted by degree ($n = 500$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.001	0.033	95.0%	94.6%	0	0	0.001	0.036	91.3%	90.6%	0	0
0.10	0.001	0.028	95.0%	94.8%	0	0	0.001	0.030	92.6%	92.0%	0	0
0.15	0.001	0.025	94.8%	94.2%	0	0	0.001	0.026	93.4%	93.2%	0	0
0.20	0.000	0.023	94.6%	94.6%	0	0	0.001	0.025	94.2%	93.5%	0	0
0.25	0.000	0.023	94.8%	94.4%	0	0	0.001	0.024	94.4%	94.1%	0	0
0.30	0.000	0.024	95.1%	94.3%	0	0	0.001	0.026	94.4%	93.6%	0	0
0.35	0.000	0.027	96.0%	95.3%	0	0	0.001	0.029	93.3%	92.6%	0	0
0.40	0.000	0.033	95.9%	95.5%	0	0	0.001	0.033	91.7%	90.8%	0	0
0.45	0.000	0.041	96.0%	95.4%	0	0	0.000	0.037	89.0%	88.3%	0	0
0.50	0.000	0.050	95.6%	95.6%	0	2	0.001	0.043	86.6%	85.7%	0	0
0.55	0.000	0.059	95.6%	95.6%	0	3	0.000	0.049	84.1%	82.8%	0	0
0.60	0.000	0.068	95.6%	95.3%	1	5	0.000	0.056	81.3%	80.1%	0	0
0.65	0.000	0.076	95.0%	95.3%	1	7	0.001	0.063	78.5%	77.2%	0	0
0.70	0.000	0.083	94.4%	94.8%	3	10	0.001	0.070	74.5%	73.7%	0	0
0.75	0.001	0.091	93.5%	94.1%	3	14	0.002	0.077	70.5%	70.2%	0	0
0.80	0.001	0.098	92.2%	92.7%	3	18	0.002	0.085	66.6%	65.4%	0	0
0.85	0.002	0.105	90.6%	91.2%	3	22	0.002	0.092	62.4%	61.7%	0	0
0.90	0.003	0.114	88.4%	89.0%	2	21	0.002	0.100	58.6%	57.2%	0	0
0.95	0.004	0.124	85.2%	85.4%	3	16	0.003	0.108	54.3%	53.2%	1	0
Shift in log-odds												
-2.5	0.001	0.036	95.3%	94.6%	0	0	0.000	0.040	90.3%	89.6%	0	0
-2.0	0.001	0.033	95.1%	94.5%	0	0	0.000	0.036	91.2%	90.4%	0	0
-1.5	0.001	0.030	94.8%	94.5%	0	0	0.000	0.032	91.7%	91.3%	0	0
-1.0	0.001	0.026	94.9%	94.7%	0	0	0.000	0.027	92.8%	92.3%	0	0
-0.5	0.001	0.023	94.6%	94.5%	0	0	0.000	0.023	94.0%	93.5%	0	0
0.5	0.001	0.024	95.5%	94.3%	0	0	0.000	0.023	94.6%	93.9%	0	0
1.0	0.001	0.034	95.5%	94.7%	0	0	0.000	0.030	90.8%	89.7%	0	0
1.5	0.002	0.055	95.7%	95.2%	0	2	0.000	0.042	85.0%	83.5%	0	0
2.0	0.003	0.075	95.5%	94.9%	0	7	-0.001	0.056	79.0%	77.8%	0	0
2.5	0.004	0.091	94.7%	93.9%	4	11	-0.001	0.071	72.4%	71.8%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained. The maximum degree for participants was restricted to be 18 or less.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.7: Network-TMLE for statins and atherosclerotic heart disease, and the clustered power-law random graph unrestricted ($n = 500$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.000	0.038	96.5%	96.4%	0	0	0.000	0.045	91.6%	90.8%	0	0
0.10	0.000	0.030	96.2%	96.1%	0	0	0.001	0.034	93.5%	92.3%	0	0
0.15	0.000	0.025	95.9%	95.7%	0	0	0.001	0.028	93.8%	92.9%	0	0
0.20	0.000	0.023	94.9%	95.1%	0	0	0.001	0.025	93.9%	93.2%	0	0
0.25	0.000	0.023	95.3%	95.0%	0	0	0.001	0.025	94.2%	93.9%	0	0
0.30	0.000	0.028	96.6%	95.7%	0	0	0.001	0.027	94.2%	93.4%	0	0
0.35	0.000	0.043	98.2%	96.8%	0	1	0.001	0.031	92.8%	91.8%	0	0
0.40	0.001	0.060	98.8%	98.2%	0	9	0.001	0.037	91.5%	90.3%	0	0
0.45	0.000	0.070	98.9%	99.0%	2	32	0.001	0.044	89.6%	88.0%	0	0
0.50	0.000	0.076	99.3%	99.4%	17	67	0.001	0.051	87.1%	86.0%	0	0
0.55	0.000	0.079	99.3%	99.4%	48	117	0.001	0.059	84.0%	83.0%	0	0
0.60	0.000	0.083	99.4%	99.4%	85	171	0.002	0.066	80.4%	79.8%	0	0
0.65	0.000	0.086	99.4%	99.4%	117	219	0.002	0.074	76.9%	75.9%	0	0
0.70	0.000	0.089	99.3%	99.4%	138	241	0.003	0.081	73.0%	71.6%	0	0
0.75	0.001	0.093	99.2%	99.3%	145	243	0.004	0.088	68.7%	67.3%	0	0
0.80	0.001	0.097	99.1%	99.1%	140	229	0.004	0.096	64.0%	63.4%	0	0
0.85	0.002	0.102	98.9%	99.0%	128	222	0.005	0.104	60.2%	59.0%	0	0
0.90	0.003	0.108	98.4%	98.8%	103	204	0.005	0.112	55.6%	54.3%	0	0
0.95	0.004	0.117	97.0%	97.5%	85	163	0.006	0.121	50.5%	49.2%	0	0
Shift in log-odds												
-2.5	0.000	0.041	97.2%	96.9%	0	0	0.002	0.052	90.0%	89.2%	0	0
-2.0	0.000	0.037	96.7%	96.7%	0	0	0.001	0.046	90.9%	90.5%	0	0
-1.5	0.000	0.032	96.4%	96.2%	0	0	0.001	0.038	92.1%	91.7%	0	0
-1.0	0.000	0.028	95.8%	95.6%	0	0	0.001	0.030	93.3%	93.0%	0	0
-0.5	0.000	0.024	95.4%	95.3%	0	0	0.000	0.024	94.3%	93.9%	0	0
0.5	0.001	0.035	97.1%	96.7%	0	0	0.000	0.025	94.0%	93.4%	0	0
1.0	0.001	0.069	99.1%	98.7%	0	13	0.000	0.037	90.3%	89.1%	0	0
1.5	0.002	0.082	99.5%	99.5%	40	116	0.001	0.054	85.1%	84.2%	0	0
2.0	0.003	0.090	99.7%	99.6%	115	232	0.001	0.071	77.8%	77.5%	0	1
2.5	0.004	0.097	99.6%	99.6%	166	257	0.002	0.086	71.1%	70.8%	0	1

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.8: Network-TMLE for statins and atherosclerotic heart disease, and the clustered power-law random graph restricted by degree ($n = 1000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.000	0.025	96.2%	96.0%	0	0	0.000	0.027	91.2%	90.5%	0	0
0.10	0.000	0.020	96.1%	95.9%	0	0	0.000	0.022	93.0%	92.6%	0	0
0.15	0.000	0.018	95.8%	95.7%	0	0	0.000	0.019	94.1%	93.9%	0	0
0.20	-0.001	0.016	95.2%	95.2%	0	0	0.000	0.017	94.7%	94.4%	0	0
0.25	0.000	0.016	95.0%	94.9%	0	0	0.000	0.017	94.7%	94.5%	0	0
0.30	-0.001	0.017	95.2%	95.0%	0	0	0.000	0.017	94.2%	93.9%	0	0
0.35	0.000	0.019	96.0%	95.7%	0	0	0.000	0.019	93.4%	92.7%	0	0
0.40	0.000	0.024	97.1%	96.6%	0	0	0.000	0.021	91.6%	91.7%	0	0
0.45	-0.001	0.031	97.6%	97.1%	0	0	-0.001	0.024	89.1%	89.4%	0	0
0.50	0.000	0.040	97.9%	97.7%	0	0	-0.001	0.028	86.8%	86.1%	0	0
0.55	0.000	0.048	98.2%	98.0%	0	0	-0.001	0.032	83.4%	83.1%	0	0
0.60	0.001	0.055	98.5%	98.3%	0	0	0.000	0.037	80.7%	80.7%	0	0
0.65	0.001	0.061	98.5%	98.4%	0	0	-0.001	0.042	77.9%	77.3%	0	0
0.70	0.001	0.066	98.4%	98.4%	0	0	-0.001	0.048	74.7%	74.4%	0	0
0.75	0.001	0.070	98.1%	98.3%	0	0	-0.001	0.053	71.2%	71.1%	0	0
0.80	0.002	0.075	97.5%	98.0%	0	0	-0.001	0.060	67.4%	67.0%	0	0
0.85	0.002	0.080	97.0%	97.5%	0	0	-0.001	0.066	63.6%	62.6%	0	0
0.90	0.002	0.086	95.8%	96.1%	0	0	0.000	0.073	60.5%	58.8%	0	0
0.95	0.002	0.093	93.5%	93.8%	0	0	0.000	0.080	56.4%	55.3%	0	0
Shift in log-odds												
-2.5	0.002	0.028	95.1%	94.7%	0	0	0.002	0.030	90.0%	89.8%	0	0
-2.0	0.001	0.025	95.1%	94.8%	0	0	0.001	0.027	90.8%	90.2%	0	0
-1.5	0.001	0.022	95.1%	94.6%	0	0	0.001	0.023	91.5%	90.9%	0	0
-1.0	0.001	0.019	94.8%	94.9%	0	0	0.001	0.020	92.2%	92.3%	0	0
-0.5	0.001	0.017	94.9%	95.0%	0	0	0.001	0.017	93.8%	93.3%	0	0
0.5	0.001	0.017	95.6%	95.0%	0	0	0.001	0.017	93.3%	93.1%	0	0
1.0	0.001	0.029	97.8%	97.0%	0	0	0.001	0.022	89.8%	89.6%	0	0
1.5	0.001	0.048	98.5%	98.3%	0	0	0.001	0.031	84.6%	84.2%	0	0
2.0	0.000	0.061	98.4%	98.6%	0	0	0.002	0.042	79.4%	78.5%	0	0
2.5	0.001	0.069	98.0%	98.2%	0	0	0.002	0.053	73.4%	72.4%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained. The maximum degree for participants was restricted to be 22 or less.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.9: Network-TMLE for statins and atherosclerotic heart disease, and the clustered power-law random graph unrestricted ($n = 1000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.001	0.028	97.0%	97.0%	0	0	0.000	0.034	89.0%	89.3%	0	0
0.10	0.001	0.022	96.5%	96.6%	0	0	0.000	0.024	92.2%	91.6%	0	0
0.15	0.001	0.019	96.1%	96.0%	0	0	0.000	0.020	93.4%	93.3%	0	0
0.20	0.000	0.017	95.1%	95.2%	0	0	0.000	0.017	94.8%	94.4%	0	0
0.25	0.000	0.017	94.8%	94.4%	0	0	0.000	0.017	94.8%	94.5%	0	0
0.30	0.000	0.019	96.5%	96.2%	0	0	0.000	0.017	94.4%	93.4%	0	0
0.35	0.000	0.032	98.9%	98.1%	0	0	0.000	0.019	93.1%	92.7%	0	0
0.40	0.000	0.045	99.6%	99.4%	0	0	0.000	0.022	90.9%	90.9%	0	0
0.45	0.000	0.052	99.8%	99.8%	0	0	-0.001	0.026	88.5%	88.1%	0	0
0.50	0.000	0.055	99.9%	99.9%	0	0	0.000	0.031	86.1%	85.6%	0	0
0.55	0.001	0.058	99.9%	99.9%	0	0	0.000	0.036	82.9%	82.4%	0	0
0.60	0.000	0.060	100.0%	100.0%	0	0	-0.001	0.041	79.9%	79.2%	0	0
0.65	0.000	0.062	100.0%	100.0%	0	0	-0.001	0.047	76.3%	75.4%	0	0
0.70	0.001	0.064	100.0%	100.0%	0	0	0.000	0.053	72.6%	71.7%	0	0
0.75	0.001	0.067	100.0%	100.0%	0	1	0.000	0.060	68.1%	67.3%	0	0
0.80	0.001	0.070	100.0%	100.0%	0	1	0.000	0.067	63.0%	62.7%	0	0
0.85	0.001	0.073	100.0%	99.9%	0	0	0.000	0.074	58.7%	57.9%	0	0
0.90	0.002	0.078	99.9%	99.9%	0	1	0.000	0.081	54.0%	53.1%	0	0
0.95	0.002	0.083	99.8%	99.8%	0	0	0.000	0.089	49.8%	48.8%	0	0
Shift in log-odds												
-2.5	0.000	0.031	96.8%	96.8%	0	0	0.001	0.037	89.2%	88.6%	0	0
-2.0	0.000	0.028	96.7%	96.8%	0	0	0.001	0.032	90.4%	89.4%	0	0
-1.5	0.001	0.024	96.7%	96.8%	0	0	0.001	0.026	91.2%	90.8%	0	0
-1.0	0.000	0.020	96.5%	96.3%	0	0	0.001	0.021	92.4%	92.0%	0	0
-0.5	0.000	0.017	95.8%	95.6%	0	0	0.001	0.017	94.1%	93.4%	0	0
0.5	-0.001	0.029	98.2%	97.6%	0	0	0.001	0.018	93.1%	93.1%	0	0
1.0	-0.001	0.051	99.6%	99.7%	0	0	0.001	0.024	90.2%	89.4%	0	0
1.5	-0.001	0.058	99.8%	99.9%	0	0	0.002	0.035	83.9%	83.7%	0	0
2.0	-0.001	0.062	100.0%	99.9%	0	1	0.002	0.048	77.0%	76.1%	0	0
2.5	-0.001	0.066	100.0%	100.0%	0	1	0.003	0.060	69.2%	69.0%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.10: Network-TMLE for statins and atherosclerotic heart disease, and the clustered power-law random graph restricted by degree ($n = 2000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.000	0.020	96.1%	95.9%	0	0	0.000	0.023	91.0%	90.9%	0	0
0.10	0.000	0.016	95.6%	95.4%	0	0	0.000	0.017	91.8%	92.0%	0	0
0.15	0.000	0.013	95.1%	95.3%	0	0	0.000	0.014	93.4%	93.1%	0	0
0.20	0.000	0.012	94.7%	94.8%	0	0	0.000	0.013	94.1%	93.9%	0	0
0.25	0.000	0.012	94.8%	94.8%	0	0	0.000	0.012	94.3%	94.4%	0	0
0.30	0.000	0.012	94.8%	94.9%	0	0	0.000	0.012	94.2%	94.2%	0	0
0.35	0.000	0.014	96.0%	95.9%	0	0	0.000	0.013	93.2%	92.9%	0	0
0.40	0.000	0.018	97.4%	97.1%	0	0	0.000	0.015	91.3%	91.4%	0	0
0.45	0.000	0.025	97.9%	98.0%	0	0	0.000	0.018	89.9%	89.7%	0	0
0.50	-0.001	0.032	98.6%	98.7%	0	0	0.000	0.021	87.4%	87.6%	0	0
0.55	-0.001	0.037	98.8%	98.9%	0	0	0.000	0.025	85.0%	85.1%	0	0
0.60	-0.001	0.042	99.0%	99.1%	0	0	0.000	0.029	82.7%	81.9%	0	0
0.65	-0.001	0.046	99.1%	99.2%	0	0	0.000	0.034	79.6%	78.2%	0	0
0.70	-0.001	0.049	99.1%	99.2%	0	0	-0.001	0.039	75.7%	74.8%	0	0
0.75	-0.001	0.053	98.9%	99.1%	0	0	0.000	0.044	72.0%	70.4%	0	0
0.80	0.000	0.056	98.6%	98.7%	0	0	-0.001	0.050	67.4%	66.2%	0	0
0.85	0.000	0.060	98.2%	98.2%	0	0	0.000	0.055	63.2%	61.7%	0	0
0.90	0.000	0.064	96.9%	97.3%	0	0	0.000	0.061	58.3%	56.9%	0	0
0.95	0.000	0.070	94.8%	94.7%	0	0	0.000	0.068	53.1%	52.2%	0	0
Shift in log-odds												
-2.5	0.000	0.022	95.9%	95.8%	0	0	0.000	0.025	89.7%	89.6%	0	0
-2.0	0.000	0.020	96.0%	95.6%	0	0	0.000	0.022	90.7%	90.7%	0	0
-1.5	0.000	0.017	95.6%	95.8%	0	0	0.000	0.018	91.4%	91.7%	0	0
-1.0	0.000	0.014	95.6%	95.4%	0	0	0.000	0.015	92.9%	92.6%	0	0
-0.5	0.000	0.012	95.4%	95.5%	0	0	0.000	0.012	94.3%	94.2%	0	0
0.5	0.000	0.012	96.6%	95.9%	0	0	0.000	0.012	93.4%	93.4%	0	0
1.0	0.000	0.023	98.5%	98.2%	0	0	0.000	0.017	89.6%	89.0%	0	0
1.5	0.000	0.037	99.3%	99.1%	0	0	0.000	0.024	85.2%	84.8%	0	0
2.0	0.000	0.045	99.5%	99.4%	0	0	0.000	0.034	78.9%	79.2%	0	0
2.5	0.000	0.051	99.3%	99.3%	0	0	0.000	0.043	72.9%	72.7%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained. The maximum degree for participants was restricted to be 22 or less.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.11: Network-TMLE for statins and atherosclerotic heart disease, and the clustered power-law random graph unrestricted ($n = 2000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.000	0.021	97.6%	97.5%	0	0	0.000	0.026	90.3%	90.5%	0	0
0.10	0.000	0.016	96.8%	96.8%	0	0	0.000	0.019	91.7%	91.4%	0	0
0.15	0.000	0.013	96.1%	95.9%	0	0	0.000	0.015	92.8%	92.5%	0	0
0.20	0.000	0.012	95.3%	95.2%	0	0	0.000	0.013	93.9%	93.5%	0	0
0.25	0.000	0.012	94.7%	94.8%	0	0	0.000	0.012	94.2%	94.2%	0	0
0.30	0.000	0.012	95.5%	95.4%	0	0	0.000	0.012	93.8%	93.9%	0	0
0.35	0.000	0.019	98.7%	98.3%	0	0	0.000	0.014	93.3%	93.1%	0	0
0.40	0.000	0.029	99.7%	99.5%	0	0	0.000	0.016	91.8%	91.9%	0	0
0.45	0.000	0.035	99.9%	99.9%	0	0	0.000	0.019	90.0%	89.7%	0	0
0.50	0.000	0.038	99.9%	99.9%	0	0	0.000	0.023	87.1%	86.4%	0	0
0.55	0.000	0.040	100.0%	100.0%	0	0	0.000	0.027	83.5%	83.1%	0	0
0.60	0.000	0.042	100.0%	100.0%	0	0	0.000	0.031	80.8%	79.7%	0	0
0.65	0.000	0.044	100.0%	100.0%	0	0	0.000	0.036	76.0%	75.5%	0	0
0.70	0.000	0.046	100.0%	100.0%	0	0	0.000	0.041	71.7%	71.3%	0	0
0.75	0.001	0.048	100.0%	100.0%	0	0	0.000	0.047	67.8%	67.8%	0	0
0.80	0.001	0.050	100.0%	100.0%	0	0	0.000	0.052	62.6%	61.9%	0	0
0.85	0.001	0.053	100.0%	100.0%	0	0	0.000	0.058	58.3%	57.3%	0	0
0.90	0.001	0.056	99.9%	99.9%	0	0	0.001	0.065	53.3%	52.0%	0	0
0.95	0.002	0.061	99.7%	99.7%	0	0	0.001	0.071	48.9%	47.4%	0	0
Shift in log-odds												
-2.5	0.000	0.024	97.0%	96.9%	0	0	0.000	0.030	88.5%	87.9%	0	0
-2.0	0.000	0.021	96.9%	96.9%	0	0	0.000	0.025	89.7%	89.3%	0	0
-1.5	0.000	0.018	96.6%	96.7%	0	0	0.000	0.020	91.1%	91.3%	0	0
-1.0	0.000	0.014	96.5%	96.4%	0	0	0.000	0.015	92.8%	92.7%	0	0
-0.5	0.000	0.012	95.8%	95.8%	0	0	0.000	0.012	94.5%	94.2%	0	0
0.5	0.000	0.016	98.4%	97.8%	0	0	0.000	0.012	93.8%	93.4%	0	0
1.0	0.000	0.034	99.8%	99.7%	0	0	0.000	0.018	89.2%	88.4%	0	0
1.5	-0.001	0.041	100.0%	100.0%	0	0	0.000	0.026	83.3%	82.7%	0	0
2.0	0.000	0.045	100.0%	100.0%	0	0	0.000	0.036	76.2%	75.4%	0	0
2.5	0.000	0.048	100.0%	100.0%	0	0	-0.001	0.046	68.9%	67.9%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.12: Network-TMLE for naloxone and opioid overdose, and the uniform random graph ($n = 500$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.001	0.033	86.3%	85.5%	0	0	0.007	0.034	87.0%	86.2%	0	0
0.10	0.000	0.027	88.6%	88.1%	0	0	0.006	0.028	88.8%	88.2%	0	0
0.15	0.001	0.023	90.3%	90.2%	0	0	0.005	0.023	90.1%	89.7%	0	0
0.20	0.000	0.020	91.9%	91.6%	0	0	0.003	0.020	92.0%	91.7%	0	0
0.25	0.000	0.018	92.8%	92.4%	0	0	0.002	0.019	93.3%	93.0%	0	0
0.30	0.000	0.017	93.9%	93.7%	0	0	0.001	0.018	94.3%	94.1%	0	0
0.35	0.000	0.017	94.5%	94.4%	0	0	0.000	0.017	94.7%	94.5%	0	0
0.40	0.001	0.018	94.3%	94.3%	0	0	0.000	0.018	94.3%	94.4%	0	0
0.45	0.000	0.019	93.3%	93.5%	0	0	-0.002	0.019	93.1%	93.3%	0	0
0.50	0.000	0.021	92.4%	92.2%	0	0	-0.003	0.021	91.8%	91.6%	0	0
0.55	0.000	0.024	90.4%	90.6%	0	0	-0.004	0.023	89.8%	89.6%	0	0
0.60	0.000	0.026	88.7%	88.4%	0	0	-0.004	0.026	87.1%	87.0%	0	0
0.65	0.000	0.029	86.1%	85.8%	0	0	-0.005	0.028	84.7%	84.5%	0	0
0.70	0.000	0.032	84.2%	83.4%	0	0	-0.006	0.031	82.5%	82.0%	0	0
0.75	0.001	0.035	81.8%	81.7%	0	0	-0.006	0.034	80.3%	79.8%	0	0
0.80	0.001	0.038	80.1%	80.0%	0	0	-0.007	0.037	77.7%	77.4%	0	0
0.85	0.001	0.041	78.2%	77.8%	0	0	-0.007	0.040	75.5%	75.4%	0	0
0.90	0.001	0.044	76.0%	75.3%	0	0	-0.007	0.043	73.7%	73.4%	0	0
0.95	0.002	0.048	73.8%	73.1%	0	0	-0.007	0.046	71.5%	71.6%	0	0
Shift in log-odds												
-2.5	-0.001	0.034	86.5%	85.7%	0	0	0.005	0.035	86.1%	85.8%	0	0
-2.0	-0.001	0.030	87.5%	87.0%	0	0	0.005	0.031	87.2%	87.0%	0	0
-1.5	0.000	0.026	89.0%	88.7%	0	0	0.004	0.026	88.8%	88.8%	0	0
-1.0	-0.001	0.021	91.2%	90.5%	0	0	0.003	0.022	91.0%	90.6%	0	0
-0.5	0.000	0.018	93.6%	92.9%	0	0	0.001	0.018	93.9%	93.2%	0	0
0.5	0.000	0.018	92.7%	92.1%	0	0	-0.002	0.018	91.8%	91.7%	0	0
1.0	0.000	0.022	88.6%	87.7%	0	0	-0.004	0.022	86.6%	86.2%	0	0
1.5	0.000	0.027	83.7%	83.5%	0	0	-0.005	0.027	81.2%	81.2%	0	0
2.0	0.001	0.033	79.5%	79.5%	0	0	-0.006	0.032	76.6%	75.9%	0	0
2.5	0.001	0.038	76.3%	76.5%	0	0	-0.007	0.036	74.0%	73.5%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.13: Network-TMLE for naloxone and opioid overdose, and the uniform random graph ($n = 1000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.000	0.023	87.0%	86.9%	0	0	0.006	0.024	85.9%	86.0%	0	0
0.10	0.001	0.019	88.8%	88.6%	0	0	0.005	0.020	87.8%	87.9%	0	0
0.15	0.000	0.016	90.7%	90.3%	0	0	0.004	0.017	89.6%	89.3%	0	0
0.20	0.000	0.014	92.2%	91.7%	0	0	0.002	0.015	91.3%	91.2%	0	0
0.25	0.000	0.013	93.2%	93.1%	0	0	0.002	0.013	92.9%	92.7%	0	0
0.30	0.000	0.012	94.1%	94.3%	0	0	0.001	0.012	94.0%	94.1%	0	0
0.35	0.000	0.012	94.7%	94.4%	0	0	-0.001	0.012	94.6%	94.5%	0	0
0.40	0.000	0.012	94.7%	94.9%	0	0	-0.001	0.012	94.1%	94.2%	0	0
0.45	0.000	0.013	94.1%	93.9%	0	0	-0.002	0.013	93.2%	93.2%	0	0
0.50	0.000	0.014	93.3%	93.1%	0	0	-0.003	0.014	91.4%	91.5%	0	0
0.55	0.000	0.015	92.3%	92.0%	0	0	-0.004	0.016	89.7%	89.5%	0	0
0.60	0.000	0.017	90.7%	90.2%	0	0	-0.004	0.017	87.4%	87.5%	0	0
0.65	0.000	0.019	88.4%	88.0%	0	0	-0.005	0.019	85.0%	85.0%	0	0
0.70	0.000	0.021	86.8%	86.1%	0	0	-0.006	0.021	82.6%	82.4%	0	0
0.75	0.000	0.022	85.0%	84.6%	0	0	-0.007	0.022	80.6%	80.2%	0	0
0.80	0.000	0.024	82.9%	82.5%	0	0	-0.007	0.024	78.9%	78.3%	0	0
0.85	0.000	0.026	80.9%	80.6%	0	0	-0.008	0.026	76.3%	76.3%	0	0
0.90	0.001	0.028	79.0%	78.2%	0	0	-0.008	0.028	74.6%	74.6%	0	0
0.95	0.000	0.030	76.8%	76.1%	0	0	-0.009	0.030	72.5%	72.4%	0	0
Shift in log-odds												
-2.5	0.000	0.024	88.1%	87.9%	0	0	0.007	0.025	86.3%	86.4%	0	0
-2.0	0.000	0.021	89.1%	88.5%	0	0	0.006	0.022	87.2%	87.2%	0	0
-1.5	0.000	0.018	90.3%	90.0%	0	0	0.005	0.019	88.5%	88.4%	0	0
-1.0	0.000	0.015	91.8%	91.6%	0	0	0.004	0.015	90.5%	90.4%	0	0
-0.5	0.000	0.012	94.4%	94.1%	0	0	0.002	0.013	93.2%	93.1%	0	0
0.5	0.000	0.012	93.6%	93.1%	0	0	-0.002	0.012	93.7%	93.6%	0	0
1.0	0.000	0.015	89.2%	88.9%	0	0	-0.004	0.014	88.8%	88.6%	0	0
1.5	0.001	0.018	84.6%	84.5%	0	0	-0.005	0.018	82.0%	82.0%	0	0
2.0	0.001	0.022	81.3%	81.2%	0	0	-0.006	0.021	77.9%	77.7%	0	0
2.5	0.001	0.026	78.8%	78.6%	0	0	-0.007	0.024	74.7%	74.5%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.14: Network-TMLE for naloxone and opioid overdose, and the uniform random graph ($n = 2000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.000	0.016	87.5%	87.4%	0	0	0.006	0.017	86.1%	85.8%	0	0
0.10	0.000	0.013	89.1%	88.9%	0	0	0.005	0.014	87.8%	87.5%	0	0
0.15	0.000	0.011	90.5%	90.6%	0	0	0.004	0.012	89.5%	89.3%	0	0
0.20	0.000	0.010	92.2%	92.1%	0	0	0.003	0.010	91.5%	91.2%	0	0
0.25	0.000	0.009	93.6%	93.6%	0	0	0.002	0.009	93.4%	93.4%	0	0
0.30	0.000	0.008	94.6%	94.5%	0	0	0.001	0.008	94.7%	94.7%	0	0
0.35	0.000	0.008	95.4%	95.4%	0	0	0.000	0.008	95.5%	95.8%	0	0
0.40	0.000	0.008	95.2%	95.1%	0	0	-0.001	0.008	95.3%	95.2%	0	0
0.45	0.000	0.009	94.1%	94.1%	0	0	-0.002	0.009	94.0%	93.8%	0	0
0.50	0.000	0.010	93.0%	92.8%	0	0	-0.003	0.010	91.8%	91.8%	0	0
0.55	0.000	0.011	91.7%	91.4%	0	0	-0.003	0.011	89.6%	89.8%	0	0
0.60	0.000	0.012	89.6%	89.5%	0	0	-0.004	0.012	86.9%	87.0%	0	0
0.65	0.000	0.013	88.0%	87.9%	0	0	-0.005	0.013	84.8%	84.6%	0	0
0.70	0.000	0.015	86.1%	86.1%	0	0	-0.005	0.015	82.4%	82.3%	0	0
0.75	0.000	0.016	84.3%	84.4%	0	0	-0.006	0.016	80.4%	80.5%	0	0
0.80	0.000	0.018	82.3%	82.4%	0	0	-0.007	0.017	78.2%	78.4%	0	0
0.85	0.001	0.019	80.5%	80.1%	0	0	-0.007	0.019	76.4%	76.1%	0	0
0.90	0.001	0.021	78.8%	78.2%	0	0	-0.008	0.020	73.5%	73.7%	0	0
0.95	0.001	0.022	76.7%	76.7%	0	0	-0.008	0.021	71.5%	71.7%	0	0
Shift in log-odds												
-2.5	0.000	0.017	87.9%	87.9%	0	0	0.006	0.017	85.7%	85.6%	0	0
-2.0	0.000	0.015	88.9%	88.8%	0	0	0.006	0.015	86.8%	86.6%	0	0
-1.5	0.000	0.013	89.8%	89.6%	0	0	0.005	0.013	87.5%	87.8%	0	0
-1.0	0.000	0.011	91.5%	91.5%	0	0	0.003	0.011	90.3%	89.8%	0	0
-0.5	0.000	0.009	93.4%	93.3%	0	0	0.002	0.009	93.1%	92.9%	0	0
0.5	0.000	0.008	93.0%	92.8%	0	0	-0.002	0.008	92.7%	92.5%	0	0
1.0	0.000	0.010	89.4%	89.4%	0	0	-0.004	0.010	86.7%	86.5%	0	0
1.5	0.000	0.013	85.2%	85.0%	0	0	-0.005	0.012	81.0%	81.1%	0	0
2.0	0.000	0.015	82.4%	82.2%	0	0	-0.006	0.015	77.3%	77.3%	0	0
2.5	0.000	0.017	79.9%	79.6%	0	0	-0.007	0.017	74.9%	74.6%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.15: Network-TMLE for naloxone and opioid overdose, and the eX-FLU network restricted by degree ($n = 467$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.000	0.029	91.0%	90.2%	0	0	0.006	0.030	88.4%	87.7%	0	0
0.10	0.000	0.024	92.0%	91.5%	0	0	0.004	0.025	90.1%	89.2%	0	0
0.15	0.000	0.021	92.9%	92.6%	0	0	0.003	0.021	91.6%	91.4%	0	0
0.20	0.000	0.018	93.4%	93.3%	0	0	0.002	0.019	93.2%	92.5%	0	0
0.25	0.000	0.017	94.2%	94.3%	0	0	0.001	0.017	94.4%	94.0%	0	0
0.30	0.000	0.016	94.6%	94.6%	0	0	0.000	0.016	95.1%	94.5%	0	0
0.35	0.000	0.016	94.1%	93.7%	0	0	0.000	0.016	95.0%	94.4%	0	0
0.40	0.000	0.017	93.1%	93.0%	0	0	-0.001	0.017	94.5%	94.2%	0	0
0.45	0.001	0.019	91.9%	91.6%	0	0	-0.001	0.018	93.6%	93.2%	0	0
0.50	0.000	0.021	90.2%	89.8%	0	0	-0.002	0.020	91.6%	91.4%	0	0
0.55	0.001	0.023	88.3%	87.8%	0	0	-0.002	0.022	89.7%	89.4%	0	0
0.60	0.001	0.026	86.3%	85.7%	0	0	-0.003	0.024	87.1%	86.6%	0	0
0.65	0.001	0.029	84.0%	83.3%	0	0	-0.003	0.027	84.7%	84.4%	0	0
0.70	0.001	0.032	81.7%	81.1%	0	0	-0.004	0.029	82.1%	81.6%	0	0
0.75	0.002	0.035	79.0%	78.3%	0	0	-0.004	0.032	78.9%	79.0%	0	0
0.80	0.002	0.038	76.0%	75.0%	0	0	-0.004	0.035	76.3%	76.2%	0	0
0.85	0.002	0.041	72.7%	71.8%	0	0	-0.004	0.037	73.3%	73.1%	0	0
0.90	0.002	0.045	68.9%	68.6%	0	0	-0.004	0.040	71.0%	70.5%	0	0
0.95	0.003	0.048	65.1%	65.3%	0	0	-0.004	0.043	67.7%	67.6%	0	0
Shift in log-odds												
-2.5	0.001	0.030	91.0%	90.5%	0	0	0.006	0.031	88.4%	88.4%	0	0
-2.0	0.000	0.027	91.4%	90.9%	0	0	0.005	0.028	88.6%	89.2%	0	0
-1.5	0.001	0.023	92.0%	91.9%	0	0	0.005	0.024	90.5%	90.5%	0	0
-1.0	0.000	0.019	93.0%	93.0%	0	0	0.003	0.020	92.3%	91.6%	0	0
-0.5	0.000	0.016	94.2%	93.7%	0	0	0.002	0.016	93.8%	93.4%	0	0
0.5	0.000	0.016	92.2%	92.2%	0	0	-0.001	0.016	92.6%	92.8%	0	0
1.0	0.001	0.019	87.6%	87.6%	0	0	-0.002	0.019	87.2%	87.4%	0	0
1.5	0.001	0.024	82.1%	81.2%	0	0	-0.002	0.024	81.8%	81.4%	0	0
2.0	0.002	0.031	76.7%	75.8%	0	0	-0.003	0.030	77.5%	76.9%	0	0
2.5	0.002	0.036	72.8%	71.9%	0	0	-0.003	0.034	74.1%	73.9%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained. The maximum degree for participants was restricted to be 22 or less.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.16: Network-TMLE for naloxone and opioid overdose, and the eX-FLU network unrestricted ($n = 467$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.000	0.031	94.2%	94.0%	0	0	0.007	0.031	88.9%	88.4%	0	0
0.10	-0.001	0.028	94.2%	94.0%	7	7	0.005	0.025	90.9%	89.9%	0	0
0.15	-0.001	0.024	94.6%	94.3%	4	4	0.004	0.020	92.0%	91.8%	0	0
0.20	-0.001	0.020	94.8%	94.4%	2	2	0.003	0.018	93.1%	92.9%	0	0
0.25	0.000	0.017	95.2%	95.0%	0	0	0.002	0.016	94.7%	94.2%	0	0
0.30	0.000	0.017	95.3%	94.9%	0	0	0.001	0.016	94.8%	94.4%	0	0
0.35	0.000	0.018	94.6%	94.2%	0	0	0.000	0.016	94.4%	94.1%	0	0
0.40	0.000	0.019	93.2%	93.3%	0	0	-0.001	0.018	94.1%	93.9%	0	0
0.45	0.000	0.021	91.4%	91.3%	0	0	-0.001	0.019	92.6%	91.9%	0	0
0.50	0.000	0.024	88.5%	88.2%	0	0	-0.002	0.022	90.1%	89.6%	0	0
0.55	0.000	0.026	85.6%	84.9%	0	0	-0.002	0.024	87.1%	86.8%	0	0
0.60	0.000	0.029	81.8%	81.4%	0	0	-0.003	0.026	84.7%	84.4%	0	0
0.65	0.000	0.032	77.9%	77.4%	0	0	-0.003	0.028	82.0%	81.7%	0	0
0.70	0.001	0.035	73.2%	72.9%	0	0	-0.004	0.030	78.0%	78.3%	0	0
0.75	0.001	0.038	69.1%	68.3%	0	0	-0.004	0.032	74.8%	74.3%	0	0
0.80	0.001	0.041	64.0%	64.3%	0	0	-0.004	0.035	71.4%	71.0%	0	0
0.85	0.001	0.044	60.0%	59.7%	0	0	-0.005	0.037	68.5%	67.9%	0	0
0.90	0.001	0.048	54.8%	55.1%	0	0	-0.005	0.040	65.4%	64.6%	0	0
0.95	0.002	0.051	50.1%	50.3%	0	0	-0.005	0.043	62.0%	61.4%	0	0
Shift in log-odds												
-2.5	0.000	0.031	94.2%	94.1%	5	5	0.008	0.033	89.7%	89.3%	0	0
-2.0	0.000	0.029	94.0%	93.5%	2	2	0.007	0.030	90.1%	90.0%	0	0
-1.5	-0.001	0.027	93.9%	93.3%	6	6	0.005	0.025	90.7%	90.5%	0	0
-1.0	-0.002	0.026	93.5%	93.0%	7	7	0.003	0.020	92.4%	91.5%	0	0
-0.5	0.000	0.019	94.8%	94.4%	1	1	0.002	0.016	93.9%	93.4%	0	0
0.5	0.000	0.016	91.2%	90.8%	0	0	-0.001	0.015	92.1%	92.0%	0	0
1.0	0.000	0.021	84.4%	83.9%	0	0	-0.002	0.020	87.6%	86.9%	0	0
1.5	0.000	0.028	77.3%	77.2%	0	0	-0.002	0.025	81.0%	80.1%	0	0
2.0	0.001	0.035	70.3%	70.4%	0	0	-0.003	0.031	75.3%	75.1%	0	0
2.5	0.001	0.041	64.0%	63.7%	0	0	-0.003	0.035	71.0%	70.7%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.17: Network-TMLE for naloxone and opioid overdose, and the clustered power-law random graph restricted by degree ($n = 500$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.001	0.029	83.4%	82.3%	0	0	0.004	0.030	83.6%	82.2%	0	0
0.10	0.001	0.024	85.1%	84.5%	0	0	0.004	0.024	85.8%	85.0%	0	0
0.15	0.001	0.020	87.7%	87.0%	0	0	0.003	0.021	88.3%	87.6%	0	0
0.20	0.000	0.018	90.3%	89.8%	0	0	0.002	0.018	91.1%	90.6%	0	0
0.25	0.000	0.016	92.5%	92.4%	0	0	0.001	0.016	92.5%	92.3%	0	0
0.30	0.000	0.015	93.9%	93.4%	0	0	0.001	0.015	93.7%	93.5%	0	0
0.35	0.000	0.015	93.8%	93.5%	0	0	0.000	0.015	93.7%	93.7%	0	0
0.40	0.000	0.015	93.5%	93.5%	0	0	0.000	0.015	93.4%	93.1%	0	0
0.45	0.000	0.016	92.9%	92.6%	0	0	-0.001	0.016	92.8%	92.4%	0	0
0.50	0.000	0.017	91.2%	91.3%	0	0	-0.001	0.017	91.3%	91.4%	0	0
0.55	0.001	0.019	89.5%	89.8%	0	0	-0.001	0.019	89.3%	89.7%	0	0
0.60	0.001	0.021	87.5%	87.7%	0	0	-0.001	0.021	87.2%	87.0%	0	0
0.65	0.001	0.023	84.9%	85.0%	0	0	-0.001	0.023	84.7%	84.9%	0	0
0.70	0.001	0.026	82.4%	82.1%	0	0	-0.002	0.025	81.8%	81.9%	0	0
0.75	0.002	0.028	79.6%	79.5%	0	0	-0.002	0.027	79.3%	79.4%	0	0
0.80	0.002	0.030	77.1%	76.9%	0	0	-0.002	0.029	76.1%	76.4%	0	0
0.85	0.003	0.033	74.1%	73.6%	0	0	-0.002	0.032	73.8%	73.8%	0	0
0.90	0.003	0.036	70.7%	70.6%	0	0	-0.002	0.034	71.0%	71.1%	0	0
0.95	0.003	0.038	67.9%	67.7%	0	0	-0.002	0.036	67.7%	68.1%	0	0
Shift in log-odds												
-2.5	0.000	0.028	84.3%	83.8%	0	0	0.004	0.029	84.5%	83.3%	0	0
-2.0	0.000	0.025	85.5%	84.6%	0	0	0.003	0.026	85.8%	85.1%	0	0
-1.5	0.000	0.022	87.6%	87.0%	0	0	0.003	0.022	87.3%	86.9%	0	0
-1.0	0.000	0.018	89.7%	89.1%	0	0	0.002	0.019	89.7%	89.4%	0	0
-0.5	0.000	0.015	92.5%	91.8%	0	0	0.001	0.015	92.8%	92.4%	0	0
0.5	0.000	0.014	92.6%	92.2%	0	0	-0.001	0.014	92.6%	92.2%	0	0
1.0	0.001	0.017	88.8%	88.2%	0	0	-0.001	0.017	88.1%	87.9%	0	0
1.5	0.002	0.021	83.0%	82.6%	0	0	-0.001	0.021	82.8%	82.5%	0	0
2.0	0.002	0.026	78.2%	77.9%	0	0	-0.001	0.025	77.4%	77.4%	0	0
2.5	0.002	0.029	74.2%	74.0%	0	0	-0.002	0.029	74.3%	74.3%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained. The maximum degree for participants was restricted to be 18 or less.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.18: Network-TMLE for naloxone and opioid overdose, and the clustered power-law random graph unrestricted ($n = 500$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.002	0.034	86.3%	85.8%	0	0	0.004	0.034	85.0%	84.2%	0	0
0.10	0.001	0.027	88.3%	87.8%	0	0	0.003	0.026	86.8%	85.9%	0	0
0.15	0.001	0.022	89.8%	89.4%	0	0	0.002	0.022	88.4%	88.4%	0	0
0.20	0.001	0.019	91.4%	90.9%	0	0	0.002	0.018	90.5%	90.3%	0	0
0.25	0.000	0.016	93.0%	92.9%	0	0	0.001	0.016	93.0%	92.6%	0	0
0.30	0.000	0.015	94.0%	94.0%	0	0	0.000	0.015	93.9%	93.7%	0	0
0.35	0.000	0.014	94.4%	94.3%	0	0	0.000	0.014	94.5%	94.4%	0	0
0.40	0.001	0.015	93.2%	92.7%	0	0	0.000	0.015	93.9%	93.7%	0	0
0.45	0.000	0.016	91.6%	91.4%	0	0	-0.001	0.016	92.3%	91.9%	0	0
0.50	0.001	0.018	89.0%	88.8%	0	0	-0.001	0.017	89.7%	89.6%	0	0
0.55	0.001	0.020	86.5%	86.0%	0	0	-0.002	0.019	87.2%	87.0%	0	0
0.60	0.001	0.023	82.9%	82.4%	0	0	-0.002	0.021	83.9%	83.7%	0	0
0.65	0.002	0.025	79.0%	79.1%	0	0	-0.002	0.024	80.8%	80.1%	0	0
0.70	0.002	0.029	75.4%	75.2%	0	0	-0.003	0.026	77.4%	77.0%	0	0
0.75	0.002	0.032	71.5%	71.2%	0	0	-0.003	0.028	73.9%	73.2%	0	0
0.80	0.003	0.035	67.3%	67.3%	0	0	-0.003	0.031	70.1%	69.4%	0	0
0.85	0.003	0.039	63.3%	63.1%	0	0	-0.003	0.034	66.5%	65.9%	0	0
0.90	0.004	0.042	59.6%	59.2%	0	0	-0.003	0.036	62.7%	62.4%	0	0
0.95	0.004	0.046	55.1%	54.6%	0	0	-0.003	0.039	59.5%	59.1%	0	0
Shift in log-odds												
-2.5	0.001	0.033	88.2%	87.5%	0	0	0.004	0.034	84.9%	84.4%	0	0
-2.0	0.000	0.029	88.6%	88.3%	0	0	0.003	0.030	85.8%	85.4%	0	0
-1.5	0.000	0.024	89.7%	89.1%	0	0	0.002	0.024	87.6%	86.9%	0	0
-1.0	0.000	0.019	91.5%	91.3%	0	0	0.002	0.019	89.6%	89.3%	0	0
-0.5	0.000	0.015	93.6%	93.0%	0	0	0.001	0.015	92.7%	92.3%	0	0
0.5	0.000	0.014	91.2%	91.0%	0	0	-0.001	0.014	92.2%	91.8%	0	0
1.0	0.000	0.018	85.1%	84.8%	0	0	-0.001	0.018	86.0%	85.8%	0	0
1.5	0.001	0.023	76.2%	75.9%	0	0	-0.001	0.022	78.7%	78.2%	0	0
2.0	0.001	0.028	69.2%	69.0%	0	0	-0.001	0.027	71.8%	71.7%	0	0
2.5	0.002	0.033	63.1%	62.5%	0	0	-0.001	0.031	66.1%	66.3%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.19: Network-TMLE for naloxone and opioid overdose, and the clustered power-law random graph restricted by degree ($n = 1000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.001	0.021	88.3%	88.0%	0	0	0.005	0.023	87.7%	87.4%	0	0
0.10	0.000	0.016	90.2%	89.8%	0	0	0.004	0.020	88.7%	88.4%	0	0
0.15	0.000	0.014	91.9%	91.7%	0	0	0.004	0.017	89.6%	89.9%	0	0
0.20	-0.001	0.012	93.2%	93.2%	0	0	0.002	0.014	91.0%	90.7%	0	0
0.25	0.000	0.011	94.3%	94.1%	0	0	0.001	0.011	93.3%	93.0%	0	0
0.30	0.000	0.010	94.7%	94.7%	0	0	-0.001	0.010	93.2%	93.1%	0	0
0.35	0.000	0.010	94.5%	94.7%	0	0	-0.002	0.012	87.7%	87.6%	0	0
0.40	0.000	0.011	93.7%	93.6%	0	0	-0.003	0.015	81.8%	81.7%	0	0
0.45	0.000	0.012	92.4%	92.3%	0	0	-0.003	0.019	76.4%	76.8%	0	0
0.50	0.000	0.013	91.1%	90.3%	0	0	-0.004	0.022	71.8%	72.4%	0	0
0.55	0.000	0.014	88.9%	88.2%	0	0	0.005	0.023	87.7%	87.4%	0	0
0.60	0.000	0.016	85.8%	85.7%	0	0	0.004	0.020	88.7%	88.4%	0	0
0.65	0.000	0.018	82.6%	82.3%	0	0	0.004	0.017	89.6%	89.9%	0	0
0.70	0.001	0.020	79.7%	79.4%	0	0	0.002	0.014	91.0%	90.7%	0	0
0.75	0.001	0.022	77.3%	76.9%	0	0	0.001	0.011	93.3%	93.0%	0	0
0.80	0.001	0.024	73.8%	73.5%	0	0	-0.001	0.010	93.2%	93.1%	0	0
0.85	0.001	0.026	70.7%	70.5%	0	0	-0.002	0.012	87.7%	87.6%	0	0
0.90	0.001	0.028	67.6%	67.3%	0	0	-0.003	0.015	81.8%	81.7%	0	0
0.95	0.001	0.030	64.3%	64.0%	0	0	-0.003	0.019	76.4%	76.8%	0	0
Shift in log-odds												
-2.5	0.000	0.022	88.0%	88.0%	0	0	0.005	0.023	87.7%	87.4%	0	0
-2.0	0.000	0.019	88.6%	88.3%	0	0	0.004	0.020	88.7%	88.4%	0	0
-1.5	0.000	0.016	89.8%	90.0%	0	0	0.004	0.017	89.6%	89.9%	0	0
-1.0	0.000	0.013	91.8%	91.9%	0	0	0.002	0.014	91.0%	90.7%	0	0
-0.5	0.000	0.011	93.8%	93.4%	0	0	0.001	0.011	93.3%	93.0%	0	0
0.5	0.000	0.010	92.8%	92.8%	0	0	-0.001	0.010	93.2%	93.1%	0	0
1.0	0.000	0.012	87.7%	87.4%	0	0	-0.002	0.012	87.7%	87.6%	0	0
1.5	0.000	0.016	82.7%	81.9%	0	0	-0.003	0.015	81.8%	81.7%	0	0
2.0	0.001	0.020	77.0%	76.7%	0	0	-0.003	0.019	76.4%	76.8%	0	0
2.5	0.001	0.024	72.4%	72.0%	0	0	-0.004	0.022	71.8%	72.4%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained. The maximum degree for participants was restricted to be 22 or less.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.20: Network-TMLE for naloxone and opioid overdose, and the clustered power-law random graph unrestricted ($n = 1000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.000	0.023	92.3%	92.0%	0	0	0.005	0.024	89.5%	89.2%	0	0
0.10	-0.001	0.020	92.9%	92.6%	4	4	0.004	0.018	91.0%	90.5%	1	1
0.15	-0.001	0.017	94.1%	93.5%	5	5	0.003	0.015	92.3%	92.3%	1	1
0.20	-0.001	0.014	94.7%	94.6%	4	4	0.002	0.012	93.5%	93.1%	0	0
0.25	0.000	0.011	95.4%	95.2%	0	0	0.001	0.011	94.2%	93.8%	0	0
0.30	0.000	0.010	95.4%	95.5%	0	0	0.000	0.010	94.4%	94.3%	0	0
0.35	0.000	0.010	94.1%	94.4%	0	0	0.000	0.010	94.3%	94.4%	0	0
0.40	0.000	0.010	92.5%	92.5%	0	0	-0.001	0.011	93.0%	92.6%	0	0
0.45	0.000	0.011	90.7%	90.2%	0	0	-0.001	0.011	90.6%	90.3%	0	0
0.50	0.000	0.013	87.1%	87.2%	0	0	-0.002	0.013	88.1%	87.6%	0	0
0.55	0.000	0.014	82.9%	82.7%	0	0	-0.003	0.014	84.0%	83.5%	0	0
0.60	0.000	0.016	78.5%	78.6%	0	0	-0.003	0.015	80.8%	80.2%	0	0
0.65	0.000	0.018	73.2%	73.0%	0	0	-0.003	0.017	76.4%	76.2%	0	0
0.70	0.000	0.020	68.6%	68.4%	0	0	-0.004	0.019	73.4%	73.2%	0	0
0.75	0.000	0.022	63.8%	63.4%	0	0	-0.004	0.021	69.8%	69.5%	0	0
0.80	0.001	0.024	59.3%	59.4%	0	0	-0.004	0.022	66.1%	65.9%	0	0
0.85	0.001	0.026	54.8%	54.7%	0	0	-0.005	0.024	63.0%	62.0%	0	0
0.90	0.001	0.028	50.4%	50.0%	0	0	-0.005	0.026	58.6%	58.4%	0	0
0.95	0.001	0.031	46.4%	46.1%	0	0	-0.005	0.028	55.3%	55.2%	0	0
Shift in log-odds												
-2.5	0.000	0.024	92.5%	92.1%	0	0	0.005	0.025	89.9%	89.1%	0	0
-2.0	0.000	0.022	92.7%	92.7%	0	0	0.004	0.022	90.5%	90.2%	0	0
-1.5	-0.001	0.020	93.1%	93.1%	4	4	0.004	0.018	91.4%	90.9%	0	0
-1.0	-0.001	0.017	93.6%	93.5%	0	0	0.002	0.014	92.7%	92.2%	0	0
-0.5	0.000	0.011	94.6%	94.7%	0	0	0.001	0.011	93.7%	93.5%	0	0
0.5	0.000	0.010	90.8%	90.4%	0	0	-0.001	0.010	91.9%	92.1%	0	0
1.0	0.000	0.013	82.6%	82.2%	0	0	-0.002	0.012	84.8%	84.6%	0	0
1.5	0.000	0.017	72.5%	72.3%	0	0	-0.003	0.016	76.7%	76.1%	0	0
2.0	0.001	0.021	63.3%	63.0%	0	0	-0.004	0.019	69.6%	69.5%	0	0
2.5	0.001	0.025	56.1%	56.0%	0	0	-0.004	0.022	63.8%	63.9%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.21: Network-TMLE for naloxone and opioid overdose, and the clustered power-law random graph restricted by degree ($n = 2000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.000	0.015	87.6%	87.6%	0	0	0.003	0.016	87.7%	87.4%	0	0
0.10	0.000	0.012	89.1%	88.9%	0	0	0.002	0.012	88.4%	88.1%	0	0
0.15	0.000	0.010	90.9%	90.7%	0	0	0.002	0.010	89.3%	89.4%	0	0
0.20	0.000	0.008	92.2%	91.9%	0	0	0.001	0.009	91.1%	90.9%	0	0
0.25	0.000	0.007	92.9%	92.9%	0	0	0.001	0.007	92.9%	92.7%	0	0
0.30	0.000	0.007	93.9%	94.3%	0	0	0.000	0.007	94.0%	94.0%	0	0
0.35	0.000	0.007	94.3%	94.2%	0	0	0.000	0.007	94.4%	94.6%	0	0
0.40	0.000	0.007	93.9%	93.7%	0	0	0.000	0.007	93.6%	93.4%	0	0
0.45	0.000	0.008	92.8%	92.6%	0	0	-0.001	0.007	92.5%	92.4%	0	0
0.50	0.000	0.008	91.4%	91.1%	0	0	-0.001	0.008	91.2%	91.0%	0	0
0.55	0.000	0.009	89.6%	89.3%	0	0	-0.001	0.009	88.9%	89.0%	0	0
0.60	0.000	0.010	87.1%	87.1%	0	0	-0.001	0.010	86.4%	86.3%	0	0
0.65	0.000	0.011	84.7%	84.5%	0	0	-0.002	0.011	83.9%	83.7%	0	0
0.70	0.001	0.013	81.8%	81.8%	0	0	-0.002	0.012	80.9%	80.7%	0	0
0.75	0.001	0.014	78.9%	78.8%	0	0	-0.002	0.013	78.3%	78.6%	0	0
0.80	0.001	0.015	75.6%	75.3%	0	0	-0.002	0.014	75.8%	75.5%	0	0
0.85	0.001	0.016	73.0%	72.5%	0	0	-0.002	0.015	73.1%	73.2%	0	0
0.90	0.001	0.018	69.4%	69.4%	0	0	-0.002	0.016	71.0%	70.5%	0	0
0.95	0.001	0.019	65.8%	66.0%	0	0	-0.002	0.018	67.7%	68.0%	0	0
Shift in log-odds												
-2.5	0.000	0.015	87.9%	87.7%	0	0	0.003	0.016	86.2%	86.1%	0	0
-2.0	0.000	0.013	88.5%	88.3%	0	0	0.003	0.014	87.2%	86.9%	0	0
-1.5	0.000	0.011	89.6%	89.8%	0	0	0.002	0.011	89.1%	88.7%	0	0
-1.0	0.000	0.009	91.0%	91.1%	0	0	0.001	0.009	90.3%	90.1%	0	0
-0.5	0.000	0.007	92.7%	92.5%	0	0	0.000	0.007	92.7%	92.7%	0	0
0.5	0.000	0.006	92.3%	92.1%	0	0	-0.001	0.006	91.9%	92.0%	0	0
1.0	0.000	0.008	87.3%	87.2%	0	0	-0.002	0.008	86.7%	86.7%	0	0
1.5	0.000	0.010	81.3%	81.3%	0	0	-0.002	0.010	80.8%	80.7%	0	0
2.0	0.000	0.012	76.5%	76.3%	0	0	-0.002	0.012	76.0%	76.0%	0	0
2.5	0.000	0.014	72.3%	72.2%	0	0	-0.003	0.013	71.9%	71.8%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained. The maximum degree for participants was restricted to be 22 or less.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.22: Network-TMLE for naloxone and opioid overdose, and the clustered power-law random graph unrestricted ($n = 2000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.000	0.016	90.0%	90.0%	0	0	0.003	0.017	86.2%	85.7%	0	0
0.10	0.000	0.013	90.6%	90.3%	0	0	0.002	0.013	88.1%	87.7%	0	0
0.15	0.000	0.010	91.5%	91.4%	0	0	0.001	0.010	89.1%	89.0%	0	0
0.20	0.000	0.008	92.7%	92.4%	0	0	0.001	0.009	91.2%	90.9%	0	0
0.25	0.000	0.007	93.7%	93.6%	0	0	0.000	0.007	92.5%	92.6%	0	0
0.30	0.000	0.007	94.5%	94.6%	0	0	0.000	0.007	93.8%	93.9%	0	0
0.35	0.000	0.007	94.1%	94.1%	0	0	0.000	0.007	94.6%	94.5%	0	0
0.40	0.000	0.007	93.6%	93.2%	0	0	0.000	0.007	93.5%	93.5%	0	0
0.45	0.000	0.007	91.5%	91.4%	0	0	0.000	0.007	92.0%	91.8%	0	0
0.50	0.000	0.008	89.4%	89.1%	0	0	-0.001	0.008	89.8%	89.5%	0	0
0.55	0.000	0.009	86.3%	86.4%	0	0	-0.001	0.009	87.4%	87.2%	0	0
0.60	0.000	0.010	82.9%	82.9%	0	0	-0.001	0.010	84.5%	84.5%	0	0
0.65	0.000	0.012	79.2%	79.4%	0	0	-0.001	0.011	81.4%	81.6%	0	0
0.70	0.000	0.013	75.4%	75.1%	0	0	-0.001	0.012	78.3%	77.9%	0	0
0.75	0.001	0.014	71.0%	71.0%	0	0	-0.001	0.014	74.8%	74.7%	0	0
0.80	0.001	0.016	66.4%	66.4%	0	0	-0.002	0.015	71.1%	71.2%	0	0
0.85	0.001	0.017	62.1%	62.1%	0	0	-0.002	0.016	67.6%	67.6%	0	0
0.90	0.001	0.019	57.2%	57.2%	0	0	-0.002	0.017	63.9%	63.8%	0	0
0.95	0.001	0.020	53.1%	53.0%	0	0	-0.002	0.018	59.5%	59.6%	0	0
Shift in log-odds												
-2.5	0.000	0.017	89.9%	89.8%	0	0	0.002	0.017	86.7%	86.9%	0	0
-2.0	0.000	0.014	90.8%	90.7%	0	0	0.002	0.015	87.8%	87.8%	0	0
-1.5	0.000	0.012	91.1%	91.5%	0	0	0.002	0.012	89.0%	88.9%	0	0
-1.0	0.000	0.009	92.4%	92.2%	0	0	0.001	0.009	91.1%	90.8%	0	0
-0.5	0.000	0.007	93.4%	93.3%	0	0	0.000	0.007	92.9%	92.6%	0	0
0.5	0.000	0.006	90.9%	90.9%	0	0	-0.001	0.006	91.4%	91.6%	0	0
1.0	0.000	0.008	83.0%	82.6%	0	0	-0.001	0.008	84.1%	83.7%	0	0
1.5	0.000	0.010	75.2%	75.0%	0	0	-0.002	0.010	76.3%	76.2%	0	0
2.0	0.000	0.013	68.2%	68.4%	0	0	-0.002	0.012	70.8%	70.7%	0	0
2.5	0.000	0.015	62.1%	62.3%	0	0	-0.002	0.014	65.4%	65.3%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Diet and body mass index

Table D.23: Network-TMLE for diet and body mass index, and the uniform random graph ($n = 500$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.004	0.090	93.6%	93.2%	1123	1123	0.051	0.093	89.7%	89.1%	1123	1123
0.10	-0.005	0.084	93.6%	93.2%	0	0	0.043	0.088	90.3%	89.8%	0	0
0.15	-0.003	0.080	93.4%	93.2%	0	0	0.039	0.084	91.2%	90.7%	0	0
0.20	-0.002	0.077	93.4%	93.2%	0	0	0.034	0.079	92.0%	91.4%	0	0
0.25	-0.002	0.072	93.4%	93.4%	0	0	0.028	0.075	92.6%	92.4%	0	0
0.30	-0.002	0.069	93.5%	93.8%	0	0	0.022	0.071	93.7%	93.7%	0	0
0.35	-0.001	0.065	94.0%	93.8%	0	0	0.016	0.067	93.8%	93.9%	0	0
0.40	-0.003	0.062	93.9%	93.8%	0	0	0.008	0.064	94.9%	94.8%	0	0
0.45	-0.002	0.060	94.0%	93.9%	0	0	0.002	0.062	95.2%	95.5%	0	0
0.50	0.000	0.059	94.8%	94.7%	0	0	-0.003	0.061	95.8%	95.4%	0	0
0.55	0.000	0.060	94.6%	94.4%	0	0	-0.010	0.063	95.7%	95.7%	0	0
0.60	-0.003	0.064	94.8%	94.4%	0	0	-0.020	0.068	94.0%	94.2%	0	0
0.65	0.002	0.072	94.7%	94.0%	0	0	-0.022	0.076	94.4%	94.0%	0	0
0.70	-0.005	0.081	94.0%	93.5%	0	0	-0.035	0.088	92.2%	92.1%	0	0
0.75	-0.002	0.094	93.3%	92.7%	0	0	-0.040	0.102	91.8%	91.4%	0	0
0.80	-0.004	0.109	93.6%	92.8%	0	0	-0.048	0.118	90.8%	90.7%	0	0
0.85	-0.003	0.125	93.8%	93.2%	0	0	-0.054	0.137	90.1%	90.1%	0	0
0.90	-0.002	0.143	93.9%	93.3%	0	0	-0.060	0.156	90.3%	90.2%	0	0
0.95	-0.004	0.163	94.1%	93.7%	0	0	-0.068	0.177	90.3%	89.5%	0	0
Shift in log-odds												
-2.5	-0.002	0.069	93.9%	93.8%	0	0	0.044	0.074	90.7%	90.7%	0	0
-2.0	-0.003	0.063	93.8%	93.8%	0	0	0.038	0.067	91.7%	91.5%	0	0
-1.5	-0.002	0.058	93.9%	93.4%	0	0	0.032	0.060	92.6%	92.4%	0	0
-1.0	-0.001	0.052	94.3%	94.0%	0	0	0.024	0.054	94.3%	93.9%	0	0
-0.5	0.001	0.048	94.2%	93.3%	0	0	0.015	0.049	95.6%	95.5%	0	0
0.5	0.000	0.051	94.0%	93.5%	0	0	-0.013	0.052	95.3%	95.4%	0	0
1.0	0.002	0.065	93.9%	93.6%	0	0	-0.026	0.070	93.4%	93.2%	0	0
1.5	0.004	0.089	94.3%	93.8%	0	0	-0.038	0.099	92.3%	91.7%	0	0
2.0	0.005	0.117	94.2%	94.1%	0	0	-0.049	0.130	91.9%	91.2%	0	0
2.5	0.007	0.141	94.3%	93.9%	0	0	-0.057	0.155	91.6%	90.6%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: no point estimate was obtained.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.24: Network-TMLE for diet and body mass index, and the uniform random graph ($n = 1000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.002	0.061	95.2%	94.6%	375	375	0.054	0.065	85.9%	85.3%	345	345
0.10	-0.002	0.059	94.7%	94.7%	0	0	0.049	0.062	86.7%	86.3%	0	0
0.15	-0.001	0.056	94.9%	94.5%	0	0	0.043	0.059	88.2%	87.8%	0	0
0.20	-0.001	0.053	94.7%	94.7%	0	0	0.037	0.056	89.5%	89.0%	0	0
0.25	-0.002	0.050	94.2%	94.4%	0	0	0.031	0.052	91.3%	90.9%	0	0
0.30	-0.002	0.048	94.1%	94.0%	0	0	0.025	0.050	92.3%	91.9%	0	0
0.35	-0.002	0.045	93.6%	93.7%	0	0	0.018	0.047	93.8%	93.5%	0	0
0.40	-0.002	0.043	93.8%	93.7%	0	0	0.012	0.044	94.4%	94.4%	0	0
0.45	0.000	0.041	93.7%	93.5%	0	0	0.007	0.042	95.1%	94.8%	0	0
0.50	-0.002	0.040	93.6%	93.9%	0	0	-0.001	0.041	95.3%	95.4%	0	0
0.55	0.000	0.040	94.3%	94.3%	0	0	-0.007	0.042	94.9%	94.8%	0	0
0.60	-0.002	0.042	94.5%	94.2%	0	0	-0.015	0.044	94.0%	93.8%	0	0
0.65	-0.002	0.045	94.2%	94.2%	0	0	-0.022	0.049	92.4%	92.0%	0	0
0.70	-0.001	0.051	94.9%	94.6%	0	0	-0.028	0.056	92.1%	91.8%	0	0
0.75	0.000	0.057	95.4%	95.2%	0	0	-0.034	0.065	91.1%	90.4%	0	0
0.80	0.000	0.067	95.2%	95.0%	0	0	-0.041	0.076	90.4%	89.8%	0	0
0.85	0.000	0.078	95.3%	95.1%	0	0	-0.049	0.089	90.0%	89.6%	0	0
0.90	0.000	0.091	95.5%	95.3%	0	0	-0.055	0.103	89.8%	89.8%	0	0
0.95	0.000	0.105	95.7%	95.4%	0	0	-0.062	0.119	90.7%	90.6%	0	0
Shift in log-odds												
-2.5	-0.001	0.049	94.5%	94.1%	0	0	0.048	0.052	85.9%	84.9%	0	0
-2.0	-0.001	0.045	94.7%	94.4%	0	0	0.041	0.047	86.6%	86.3%	0	0
-1.5	-0.001	0.041	94.3%	94.0%	0	0	0.033	0.043	88.9%	88.1%	0	0
-1.0	-0.001	0.037	94.2%	94.1%	0	0	0.024	0.038	91.7%	91.1%	0	0
-0.5	0.000	0.034	94.5%	94.4%	0	0	0.013	0.034	94.9%	94.5%	0	0
0.5	-0.001	0.035	94.3%	94.2%	0	0	-0.015	0.035	95.1%	94.7%	0	0
1.0	0.000	0.043	94.4%	94.4%	0	0	-0.027	0.045	91.6%	91.5%	0	0
1.5	0.000	0.056	94.9%	94.4%	0	0	-0.038	0.062	90.3%	89.5%	0	0
2.0	0.002	0.073	95.6%	95.3%	0	0	-0.046	0.082	90.6%	89.8%	0	0
2.5	0.002	0.088	95.7%	95.5%	0	0	-0.054	0.099	90.3%	89.7%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: no point estimate was obtained.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.25: Network-TMLE for diet and body mass index, and the uniform random graph ($n = 2000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.001	0.040	94.3%	94.1%	38	38	0.050	0.041	75.8%	75.5%	38	38
0.10	-0.001	0.038	94.2%	94.2%	0	0	0.044	0.039	78.9%	78.8%	0	0
0.15	-0.001	0.036	94.1%	94.0%	0	0	0.039	0.037	81.8%	81.5%	0	0
0.20	0.000	0.034	93.8%	93.7%	0	0	0.033	0.035	85.1%	84.8%	0	0
0.25	0.000	0.033	93.9%	93.6%	0	0	0.027	0.034	88.1%	87.8%	0	0
0.30	0.000	0.031	94.0%	93.8%	0	0	0.020	0.032	91.1%	90.9%	0	0
0.35	0.000	0.029	94.2%	94.0%	0	0	0.014	0.030	93.3%	93.4%	0	0
0.40	0.001	0.029	93.7%	93.9%	0	0	0.008	0.029	94.4%	94.4%	0	0
0.45	0.002	0.028	94.2%	94.0%	0	0	0.002	0.028	95.3%	95.5%	0	0
0.50	0.001	0.027	94.2%	94.0%	0	0	-0.005	0.028	95.4%	95.3%	0	0
0.55	0.001	0.028	94.1%	94.0%	0	0	-0.013	0.029	94.4%	94.3%	0	0
0.60	0.001	0.030	94.0%	94.0%	0	0	-0.020	0.031	91.7%	91.4%	0	0
0.65	0.002	0.033	94.8%	94.4%	0	0	-0.027	0.036	89.1%	88.8%	0	0
0.70	0.000	0.039	94.9%	94.5%	0	0	-0.036	0.042	86.5%	86.4%	0	0
0.75	0.001	0.045	95.2%	94.9%	0	0	-0.043	0.050	86.3%	85.7%	0	0
0.80	-0.001	0.053	95.7%	95.3%	0	0	-0.052	0.060	85.3%	84.9%	0	0
0.85	0.001	0.063	96.1%	95.5%	0	0	-0.058	0.071	86.4%	86.0%	0	0
0.90	0.001	0.073	96.4%	96.3%	0	0	-0.065	0.082	87.4%	87.2%	0	0
0.95	0.000	0.085	96.6%	96.3%	0	0	-0.073	0.094	87.7%	87.6%	0	0
Shift in log-odds												
-2.5	-0.002	0.033	94.4%	94.3%	0	0	0.043	0.034	77.4%	77.3%	0	0
-2.0	-0.001	0.030	94.4%	94.3%	0	0	0.038	0.032	79.8%	79.3%	0	0
-1.5	0.000	0.028	94.4%	94.3%	0	0	0.032	0.029	83.0%	82.2%	0	0
-1.0	-0.001	0.026	94.5%	94.3%	0	0	0.023	0.026	88.7%	88.3%	0	0
-0.5	0.000	0.024	94.6%	94.5%	0	0	0.012	0.024	94.1%	94.0%	0	0
0.5	0.000	0.025	95.0%	94.7%	0	0	-0.014	0.025	92.5%	92.4%	0	0
1.0	0.001	0.031	95.1%	94.7%	0	0	-0.029	0.032	86.7%	86.7%	0	0
1.5	0.001	0.042	95.5%	95.4%	0	0	-0.042	0.045	85.0%	84.8%	0	0
2.0	0.001	0.056	96.1%	96.1%	0	0	-0.054	0.061	86.1%	85.5%	0	0
2.5	0.002	0.069	96.2%	96.3%	0	0	-0.062	0.076	87.4%	86.9%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: no point estimate was obtained.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.26: Network-TMLE for diet and body mass index, and the eX-FLU network restricted by degree ($n = 467$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.011	0.170	91.1%	90.1%	0	0	0.145	0.203	78.8%	81.0%	0	0
0.10	-0.009	0.166	92.1%	90.8%	0	0	0.132	0.195	80.2%	82.4%	0	0
0.15	-0.011	0.161	92.6%	91.7%	0	0	0.112	0.183	82.8%	85.8%	0	0
0.20	-0.009	0.151	94.0%	93.1%	0	0	0.098	0.168	85.4%	88.0%	0	0
0.25	-0.008	0.139	94.5%	93.7%	0	0	0.082	0.150	87.1%	90.6%	0	0
0.30	-0.007	0.123	94.9%	94.1%	0	0	0.066	0.129	89.8%	92.8%	0	0
0.35	-0.006	0.104	95.0%	93.9%	0	0	0.051	0.107	92.4%	95.0%	0	0
0.40	-0.006	0.085	95.0%	94.1%	0	0	0.034	0.087	94.5%	96.7%	0	0
0.45	-0.006	0.071	94.7%	93.3%	0	0	0.018	0.073	96.3%	98.1%	0	0
0.50	-0.007	0.063	93.9%	93.0%	0	0	0.002	0.067	97.1%	98.4%	0	0
0.55	-0.006	0.061	94.2%	93.7%	0	0	-0.010	0.065	97.4%	98.7%	0	0
0.60	-0.004	0.062	94.0%	93.2%	0	0	-0.020	0.068	96.6%	98.1%	0	0
0.65	-0.004	0.065	94.0%	93.2%	0	0	-0.030	0.072	95.6%	97.2%	0	0
0.70	-0.002	0.069	94.2%	93.9%	0	0	-0.038	0.079	94.3%	96.1%	0	0
0.75	-0.003	0.076	94.7%	93.8%	0	0	-0.047	0.089	92.5%	94.2%	0	0
0.80	-0.003	0.085	94.7%	93.3%	0	0	-0.056	0.100	91.0%	93.0%	0	0
0.85	-0.001	0.094	94.8%	94.0%	0	0	-0.064	0.113	90.4%	92.2%	0	0
0.90	0.000	0.106	94.6%	93.8%	0	0	-0.072	0.126	89.5%	90.9%	0	0
0.95	0.000	0.118	94.3%	93.3%	0	0	-0.082	0.141	88.4%	89.5%	0	0
Shift in log-odds												
-2.5	0.003	0.167	94.6%	93.8%	0	0	0.113	0.189	84.6%	87.2%	0	0
-2.0	0.002	0.156	95.5%	94.1%	0	0	0.098	0.174	87.3%	90.5%	0	0
-1.5	0.002	0.134	95.9%	95.1%	0	0	0.085	0.150	90.2%	93.4%	0	0
-1.0	0.002	0.098	95.5%	94.6%	0	0	0.065	0.111	92.8%	96.1%	0	0
-0.5	-0.001	0.061	94.3%	93.5%	0	0	0.032	0.068	95.9%	98.0%	0	0
0.5	-0.001	0.053	94.2%	93.0%	0	0	-0.024	0.057	96.3%	98.2%	0	0
1.0	0.000	0.062	94.2%	93.5%	0	0	-0.039	0.070	94.6%	96.1%	0	0
1.5	0.000	0.075	94.6%	93.4%	0	0	-0.052	0.088	92.4%	94.1%	0	0
2.0	0.001	0.088	94.7%	93.8%	0	0	-0.063	0.106	91.1%	92.5%	0	0
2.5	0.001	0.100	94.6%	93.7%	0	0	-0.073	0.122	89.9%	91.4%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: no point estimate was obtained.
The maximum degree for participants was restricted to be 22 or less.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.27: Network-TMLE for diet and body mass index, and the eX-FLU network unrestricted ($n = 467$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.006	0.188	87.7%	86.8%	0	0	0.073	0.235	83.8%	85.3%	0	0
0.10	-0.005	0.183	89.1%	88.2%	0	0	0.068	0.226	85.2%	86.6%	0	0
0.15	-0.005	0.175	91.4%	90.4%	0	0	0.066	0.212	87.9%	89.1%	0	0
0.20	-0.005	0.164	93.7%	92.6%	0	0	0.068	0.193	90.9%	92.0%	0	0
0.25	-0.005	0.152	95.2%	94.3%	0	0	0.071	0.170	93.1%	94.7%	0	0
0.30	-0.004	0.136	96.1%	94.9%	0	0	0.069	0.145	94.2%	95.7%	0	0
0.35	-0.007	0.114	95.7%	94.6%	0	0	0.054	0.117	95.0%	96.7%	0	0
0.40	-0.004	0.090	95.3%	94.4%	0	0	0.040	0.094	95.8%	97.3%	0	0
0.45	-0.004	0.072	94.7%	93.5%	0	0	0.024	0.076	96.6%	98.2%	0	0
0.50	-0.004	0.062	94.0%	92.8%	0	0	0.009	0.068	97.5%	98.6%	0	0
0.55	-0.003	0.059	94.1%	92.8%	0	0	-0.003	0.065	97.7%	99.1%	0	0
0.60	-0.002	0.060	94.4%	93.5%	0	0	-0.014	0.065	97.2%	98.6%	0	0
0.65	-0.003	0.062	94.7%	93.6%	0	0	-0.027	0.068	96.6%	98.4%	0	0
0.70	-0.002	0.066	94.5%	93.9%	0	0	-0.037	0.074	95.1%	97.3%	0	0
0.75	-0.002	0.072	94.8%	93.7%	0	0	-0.049	0.082	94.2%	95.9%	0	0
0.80	-0.001	0.081	94.9%	94.1%	0	0	-0.058	0.093	93.4%	95.2%	0	0
0.85	0.000	0.092	95.2%	94.2%	0	0	-0.067	0.107	92.2%	94.0%	0	0
0.90	0.001	0.104	95.2%	94.2%	0	0	-0.077	0.123	90.8%	93.0%	0	0
0.95	0.002	0.119	95.1%	94.2%	0	0	-0.085	0.141	90.6%	92.5%	0	0
Shift in log-odds												
-2.5	-0.001	0.161	92.4%	91.4%	0	0	0.087	0.200	91.0%	91.7%	0	0
-2.0	0.001	0.149	94.5%	93.6%	0	0	0.095	0.181	92.9%	93.9%	0	0
-1.5	0.002	0.131	95.5%	94.6%	0	0	0.093	0.154	94.0%	95.5%	0	0
-1.0	0.001	0.097	95.1%	94.1%	0	0	0.070	0.114	94.7%	97.1%	0	0
-0.5	-0.002	0.060	94.0%	92.9%	0	0	0.029	0.068	97.2%	98.6%	0	0
0.5	0.001	0.051	94.2%	92.9%	0	0	-0.023	0.055	97.2%	99.1%	0	0
1.0	0.002	0.059	95.0%	93.8%	0	0	-0.040	0.066	95.5%	97.5%	0	0
1.5	-0.003	0.073	94.7%	93.8%	0	0	-0.060	0.085	92.7%	95.1%	0	0
2.0	0.000	0.088	95.2%	94.2%	0	0	-0.069	0.104	92.5%	94.2%	0	0
2.5	-0.001	0.101	95.0%	94.1%	0	0	-0.078	0.121	91.7%	93.5%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: no point estimate was obtained.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.28: Network-TMLE for diet and body mass index, and the clustered power-law random graph restricted by degree ($n = 500$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.003	0.162	94.5%	93.9%	0	0	0.084	0.175	89.0%	88.7%	0	0
0.10	0.002	0.158	94.7%	94.7%	0	0	0.078	0.169	89.8%	89.5%	0	0
0.15	0.003	0.152	95.3%	95.0%	0	0	0.074	0.159	90.4%	90.0%	0	0
0.20	0.004	0.143	95.5%	95.2%	0	0	0.068	0.145	90.8%	90.4%	0	0
0.25	0.003	0.130	95.7%	95.4%	0	0	0.062	0.125	91.2%	90.6%	0	0
0.30	0.002	0.111	95.4%	95.1%	0	0	0.054	0.104	91.6%	91.3%	0	0
0.35	0.000	0.088	95.3%	94.6%	0	0	0.044	0.086	92.4%	92.7%	0	0
0.40	-0.001	0.070	95.0%	94.2%	0	0	0.034	0.073	94.0%	93.7%	0	0
0.45	-0.001	0.060	94.3%	94.1%	0	0	0.024	0.066	95.0%	95.4%	0	0
0.50	0.001	0.057	94.3%	93.8%	0	0	0.017	0.063	95.7%	96.3%	0	0
0.55	0.001	0.056	94.4%	93.9%	0	0	0.008	0.062	96.7%	97.1%	0	0
0.60	0.000	0.058	94.5%	93.6%	0	0	-0.003	0.065	96.8%	97.2%	0	0
0.65	0.004	0.061	94.2%	93.6%	0	0	-0.008	0.070	96.4%	96.9%	0	0
0.70	-0.003	0.066	94.7%	93.9%	0	0	-0.023	0.078	95.6%	95.9%	0	0
0.75	0.001	0.074	94.8%	94.3%	0	0	-0.029	0.089	95.4%	95.3%	0	0
0.80	0.000	0.084	94.9%	94.0%	0	0	-0.040	0.102	93.5%	93.7%	0	0
0.85	0.001	0.096	95.0%	94.3%	0	0	-0.049	0.118	93.3%	93.5%	0	0
0.90	0.003	0.110	95.2%	94.3%	0	0	-0.057	0.136	93.0%	93.1%	0	0
0.95	0.002	0.126	95.2%	94.5%	0	0	-0.068	0.157	93.0%	93.0%	0	0
Shift in log-odds												
-2.5	-0.010	0.151	95.4%	95.1%	0	0	0.065	0.160	90.9%	90.9%	0	0
-2.0	-0.008	0.144	95.9%	95.6%	0	0	0.058	0.148	91.7%	92.0%	0	0
-1.5	-0.008	0.129	96.4%	96.3%	0	0	0.047	0.129	93.6%	93.5%	0	0
-1.0	-0.005	0.098	96.5%	96.0%	0	0	0.035	0.096	95.3%	95.6%	0	0
-0.5	0.000	0.057	95.0%	94.4%	0	0	0.021	0.059	96.7%	97.4%	0	0
0.5	-0.001	0.051	93.8%	93.5%	0	0	-0.015	0.052	97.1%	97.9%	0	0
1.0	0.003	0.060	94.8%	93.7%	0	0	-0.025	0.066	95.6%	96.2%	0	0
1.5	0.000	0.075	95.3%	94.4%	0	0	-0.042	0.086	93.9%	94.6%	0	0
2.0	0.000	0.092	95.5%	94.9%	0	0	-0.052	0.109	92.7%	93.8%	0	0
2.5	0.002	0.106	95.6%	95.2%	0	0	-0.060	0.129	92.6%	93.3%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: no point estimate was obtained.
The maximum degree for participants was restricted to be 18 or less.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.29: Network-TMLE for diet and body mass index, and the clustered power-law random graph unrestricted ($n = 500$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	0.003	0.170	94.5%	93.9%	0	0	0.119	0.205	88.7%	88.9%	0	0
0.10	0.003	0.169	95.1%	94.3%	0	0	0.114	0.202	89.4%	89.9%	0	0
0.15	0.004	0.166	95.6%	95.1%	0	0	0.109	0.196	90.5%	90.4%	0	0
0.20	0.002	0.160	95.9%	95.3%	0	0	0.101	0.185	91.3%	91.9%	0	0
0.25	0.004	0.150	96.2%	95.4%	0	0	0.094	0.170	91.6%	91.9%	0	0
0.30	0.001	0.134	96.2%	95.7%	0	0	0.079	0.147	92.2%	93.0%	0	0
0.35	0.002	0.111	95.9%	95.1%	0	0	0.063	0.118	92.8%	93.8%	0	0
0.40	0.000	0.084	95.5%	95.0%	0	0	0.044	0.091	93.6%	94.9%	0	0
0.45	0.002	0.065	94.7%	94.5%	0	0	0.031	0.073	94.6%	95.7%	0	0
0.50	-0.001	0.058	94.5%	93.9%	0	0	0.014	0.067	96.5%	97.1%	0	0
0.55	0.001	0.056	94.2%	94.0%	0	0	0.004	0.065	96.8%	97.7%	0	0
0.60	0.000	0.057	94.5%	93.9%	0	0	-0.010	0.067	96.9%	97.8%	0	0
0.65	-0.001	0.061	94.4%	93.5%	0	0	-0.022	0.071	95.9%	97.1%	0	0
0.70	-0.002	0.067	94.7%	94.2%	0	0	-0.034	0.079	94.7%	95.4%	0	0
0.75	0.000	0.076	94.4%	94.2%	0	0	-0.044	0.090	93.3%	94.1%	0	0
0.80	-0.001	0.087	94.3%	93.8%	0	0	-0.056	0.105	92.1%	92.7%	0	0
0.85	0.000	0.101	94.7%	94.2%	0	0	-0.068	0.123	91.7%	91.8%	0	0
0.90	0.001	0.117	95.2%	94.3%	0	0	-0.078	0.145	92.0%	91.9%	0	0
0.95	-0.001	0.137	95.0%	94.3%	0	0	-0.092	0.171	92.1%	91.9%	0	0
Shift in log-odds												
-2.5	-0.010	0.161	95.8%	95.3%	0	0	0.104	0.192	91.8%	92.3%	0	0
-2.0	-0.010	0.156	96.2%	95.9%	0	0	0.096	0.184	92.8%	94.0%	0	0
-1.5	-0.008	0.145	96.9%	96.4%	0	0	0.088	0.168	94.1%	95.1%	0	0
-1.0	-0.006	0.119	97.0%	96.7%	0	0	0.070	0.136	94.9%	96.3%	0	0
-0.5	-0.004	0.067	95.1%	94.4%	0	0	0.033	0.076	96.6%	98.0%	0	0
0.5	-0.001	0.051	94.3%	93.5%	0	0	-0.021	0.054	96.7%	97.9%	0	0
1.0	-0.001	0.063	94.7%	94.0%	0	0	-0.040	0.070	94.0%	95.4%	0	0
1.5	0.002	0.080	95.0%	94.3%	0	0	-0.055	0.094	92.8%	93.4%	0	0
2.0	0.002	0.100	95.2%	94.6%	0	0	-0.069	0.120	91.8%	92.5%	0	0
2.5	0.004	0.118	95.3%	95.1%	0	0	-0.079	0.144	91.6%	92.7%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: no point estimate was obtained.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.30: Network-TMLE for diet and body mass index, and the clustered power-law random graph restricted by degree ($n = 1000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.001	0.118	95.1%	95.1%	0	0	0.071	0.152	94.6%	94.9%	0	0
0.10	0.000	0.114	95.5%	95.8%	0	0	0.071	0.148	95.5%	95.4%	0	0
0.15	-0.001	0.109	96.1%	96.6%	0	0	0.065	0.141	96.1%	96.1%	0	0
0.20	-0.001	0.102	96.4%	96.7%	0	0	0.057	0.130	96.6%	96.6%	0	0
0.25	0.000	0.092	96.7%	96.9%	0	0	0.047	0.113	96.6%	96.7%	0	0
0.30	0.000	0.078	96.4%	96.5%	0	0	0.033	0.091	96.2%	96.4%	0	0
0.35	0.000	0.061	95.8%	95.9%	0	0	0.019	0.071	96.2%	96.1%	0	0
0.40	0.000	0.049	94.8%	95.1%	0	0	0.010	0.057	96.2%	95.9%	0	0
0.45	0.000	0.043	95.0%	94.9%	0	0	0.005	0.050	95.9%	95.7%	0	0
0.50	0.000	0.040	94.8%	94.5%	0	0	0.000	0.046	96.2%	95.9%	0	0
0.55	0.001	0.039	94.9%	94.8%	0	0	-0.003	0.045	96.4%	95.9%	0	0
0.60	0.000	0.040	94.5%	94.5%	0	0	-0.008	0.045	96.4%	96.0%	0	0
0.65	-0.003	0.043	94.8%	94.6%	0	0	-0.014	0.047	96.0%	95.5%	0	0
0.70	0.000	0.047	94.9%	94.6%	0	0	-0.015	0.052	95.7%	95.3%	0	0
0.75	-0.001	0.053	94.9%	94.8%	0	0	-0.020	0.059	95.3%	94.9%	0	0
0.80	-0.001	0.060	94.9%	95.0%	0	0	-0.024	0.068	94.9%	94.7%	0	0
0.85	0.000	0.070	95.4%	95.6%	0	0	-0.027	0.078	94.9%	94.7%	0	0
0.90	-0.001	0.081	95.3%	95.6%	0	0	-0.032	0.090	94.6%	94.6%	0	0
0.95	-0.002	0.094	95.6%	95.5%	0	0	-0.036	0.105	94.7%	94.7%	0	0
Shift in log-odds												
-2.5	-0.002	0.108	96.9%	96.4%	0	0	0.069	0.137	96.5%	96.2%	0	0
-2.0	-0.002	0.101	97.2%	96.7%	0	0	0.066	0.128	97.1%	96.8%	0	0
-1.5	-0.001	0.090	97.8%	97.1%	0	0	0.062	0.111	97.3%	97.0%	0	0
-1.0	-0.002	0.065	96.6%	96.0%	0	0	0.047	0.082	97.1%	96.9%	0	0
-0.5	0.000	0.037	94.8%	94.3%	0	0	0.019	0.043	97.0%	96.9%	0	0
0.5	-0.001	0.036	93.9%	93.3%	0	0	-0.011	0.036	97.0%	96.5%	0	0
1.0	0.000	0.042	94.9%	94.6%	0	0	-0.018	0.046	96.1%	95.7%	0	0
1.5	0.000	0.053	95.3%	95.0%	0	0	-0.024	0.059	95.0%	94.7%	0	0
2.0	0.001	0.066	95.7%	95.2%	0	0	-0.028	0.074	94.7%	94.4%	0	0
2.5	0.000	0.078	95.7%	95.5%	0	0	-0.032	0.087	94.5%	94.5%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: no point estimate was obtained.
The maximum degree for participants was restricted to be 22 or less.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.31: Network-TMLE for diet and body mass index, and the clustered power-law random graph unrestricted ($n = 1000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.001	0.121	94.8%	94.4%	0	0	0.153	0.218	96.7%	96.8%	0	0
0.10	-0.001	0.118	95.4%	94.8%	0	0	0.159	0.214	97.1%	97.1%	0	0
0.15	-0.001	0.115	96.0%	95.7%	0	0	0.163	0.208	97.6%	98.0%	0	0
0.20	-0.001	0.109	96.3%	96.2%	0	0	0.169	0.196	98.2%	98.7%	0	0
0.25	-0.001	0.102	96.8%	96.6%	0	0	0.165	0.175	98.4%	99.1%	0	0
0.30	-0.001	0.090	96.4%	96.3%	0	0	0.138	0.143	96.8%	99.2%	0	0
0.35	0.000	0.072	96.3%	96.0%	0	0	0.097	0.105	95.1%	98.0%	0	0
0.40	-0.001	0.055	95.2%	94.9%	0	0	0.061	0.076	94.4%	98.0%	0	0
0.45	-0.002	0.045	94.4%	94.2%	0	0	0.035	0.060	95.5%	98.0%	0	0
0.50	0.000	0.041	94.5%	94.3%	0	0	0.020	0.053	97.3%	98.9%	0	0
0.55	-0.001	0.040	94.8%	94.4%	0	0	0.007	0.049	98.0%	99.2%	0	0
0.60	-0.001	0.040	94.6%	94.3%	0	0	-0.001	0.048	98.1%	99.1%	0	0
0.65	-0.002	0.043	94.7%	94.5%	0	0	-0.010	0.050	97.8%	98.9%	0	0
0.70	-0.003	0.047	94.9%	94.9%	0	0	-0.017	0.054	97.0%	98.4%	0	0
0.75	-0.002	0.054	95.3%	94.9%	0	0	-0.023	0.061	96.7%	98.1%	0	0
0.80	-0.002	0.062	95.5%	95.1%	0	0	-0.028	0.071	96.8%	97.7%	0	0
0.85	-0.001	0.072	95.5%	95.4%	0	0	-0.033	0.082	96.5%	97.7%	0	0
0.90	-0.002	0.085	95.7%	95.8%	0	0	-0.041	0.097	96.4%	97.6%	0	0
0.95	-0.003	0.100	95.9%	95.8%	0	0	-0.051	0.114	96.5%	97.7%	0	0
Shift in log-odds												
-2.5	-0.002	0.113	96.3%	95.8%	0	0	0.160	0.202	97.9%	97.9%	0	0
-2.0	-0.001	0.108	97.0%	96.8%	0	0	0.172	0.192	99.0%	99.0%	0	0
-1.5	-0.001	0.098	97.4%	97.3%	0	0	0.178	0.175	99.5%	99.6%	0	0
-1.0	-0.001	0.077	96.8%	96.6%	0	0	0.149	0.142	98.6%	99.8%	0	0
-0.5	-0.001	0.039	95.0%	94.5%	0	0	0.056	0.066	98.2%	99.6%	0	0
0.5	0.001	0.036	94.0%	93.5%	0	0	-0.016	0.037	98.5%	99.6%	0	0
1.0	0.001	0.043	94.8%	94.5%	0	0	-0.025	0.048	97.1%	98.8%	0	0
1.5	0.001	0.055	95.6%	95.3%	0	0	-0.032	0.063	96.5%	98.1%	0	0
2.0	0.001	0.070	95.8%	95.6%	0	0	-0.038	0.079	96.3%	97.8%	0	0
2.5	0.000	0.084	95.9%	95.7%	0	0	-0.046	0.095	96.6%	97.7%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: no point estimate was obtained.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.32: Network-TMLE for diet and body mass index, and the clustered power-law random graph restricted by degree ($n = 2000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.003	0.090	96.1%	96.1%	0	0	0.035	0.089	93.8%	93.8%	0	0
0.10	-0.002	0.088	96.6%	96.8%	0	0	0.034	0.085	94.2%	93.8%	0	0
0.15	-0.002	0.085	97.1%	97.1%	0	0	0.032	0.080	94.7%	94.4%	0	0
0.20	-0.002	0.079	97.4%	97.4%	0	0	0.028	0.072	94.8%	94.8%	0	0
0.25	-0.001	0.071	97.3%	97.3%	0	0	0.022	0.061	94.5%	94.3%	0	0
0.30	-0.002	0.056	96.5%	97.0%	0	0	0.015	0.049	94.3%	94.2%	0	0
0.35	-0.001	0.042	95.5%	95.4%	0	0	0.011	0.040	94.7%	94.6%	0	0
0.40	0.001	0.034	95.3%	94.9%	0	0	0.007	0.035	94.9%	94.7%	0	0
0.45	0.001	0.030	94.6%	94.2%	0	0	0.004	0.032	94.9%	94.8%	0	0
0.50	0.001	0.028	94.4%	94.2%	0	0	0.001	0.030	95.4%	95.3%	0	0
0.55	-0.001	0.028	94.6%	94.6%	0	0	-0.004	0.029	95.6%	95.3%	0	0
0.60	0.000	0.028	95.2%	94.8%	0	0	-0.006	0.029	95.9%	95.8%	0	0
0.65	0.001	0.030	95.0%	95.0%	0	0	-0.008	0.031	95.2%	95.2%	0	0
0.70	0.000	0.032	95.4%	95.2%	0	0	-0.012	0.034	94.7%	94.4%	0	0
0.75	0.000	0.035	95.6%	95.7%	0	0	-0.015	0.037	94.6%	94.2%	0	0
0.80	-0.001	0.040	95.6%	95.4%	0	0	-0.019	0.042	93.9%	94.0%	0	0
0.85	0.001	0.046	95.5%	95.3%	0	0	-0.020	0.048	94.4%	94.2%	0	0
0.90	0.001	0.052	95.8%	95.5%	0	0	-0.024	0.055	94.1%	93.8%	0	0
0.95	0.000	0.060	95.6%	95.6%	0	0	-0.027	0.063	93.9%	93.5%	0	0
Shift in log-odds												
-2.5	-0.002	0.084	96.7%	96.5%	0	0	0.031	0.081	94.9%	94.6%	0	0
-2.0	-0.001	0.080	97.3%	96.9%	0	0	0.029	0.074	95.4%	95.3%	0	0
-1.5	-0.001	0.071	97.6%	97.5%	0	0	0.025	0.064	95.9%	95.5%	0	0
-1.0	-0.001	0.051	97.0%	96.8%	0	0	0.017	0.045	95.4%	95.3%	0	0
-0.5	-0.001	0.026	95.2%	95.0%	0	0	0.007	0.027	95.7%	95.7%	0	0
0.5	0.000	0.025	94.8%	94.8%	0	0	-0.006	0.026	95.4%	95.5%	0	0
1.0	0.000	0.030	94.6%	94.8%	0	0	-0.012	0.031	94.0%	94.0%	0	0
1.5	0.000	0.037	94.8%	94.7%	0	0	-0.017	0.039	93.5%	93.3%	0	0
2.0	0.000	0.045	94.8%	94.8%	0	0	-0.022	0.048	93.2%	92.7%	0	0
2.5	-0.001	0.052	95.0%	94.9%	0	0	-0.025	0.055	93.4%	93.3%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: no point estimate was obtained.
The maximum degree for participants was restricted to be 22 or less.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.33: Network-TMLE for diet and body mass index, and the clustered power-law random graph unrestricted ($n = 2000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.001	0.092	95.6%	95.9%	0	0	0.067	0.105	95.0%	96.1%	0	0
0.10	-0.001	0.090	95.9%	96.3%	0	0	0.068	0.103	95.6%	96.5%	0	0
0.15	-0.001	0.086	96.7%	97.1%	0	0	0.072	0.099	95.8%	96.4%	0	0
0.20	0.000	0.081	97.2%	97.3%	0	0	0.077	0.091	94.4%	95.3%	0	0
0.25	-0.001	0.075	97.3%	97.5%	0	0	0.072	0.080	92.1%	94.1%	0	0
0.30	-0.001	0.064	97.1%	97.2%	0	0	0.059	0.065	89.8%	92.3%	0	0
0.35	0.001	0.049	96.1%	95.9%	0	0	0.044	0.051	88.7%	91.2%	0	0
0.40	0.001	0.037	95.1%	94.9%	0	0	0.030	0.042	90.5%	92.3%	0	0
0.45	0.001	0.031	94.7%	94.3%	0	0	0.020	0.036	93.5%	94.6%	0	0
0.50	0.001	0.029	94.4%	94.1%	0	0	0.011	0.033	95.9%	96.8%	0	0
0.55	0.000	0.028	94.3%	94.5%	0	0	0.004	0.031	96.8%	97.7%	0	0
0.60	-0.001	0.028	94.7%	94.6%	0	0	-0.003	0.031	97.6%	98.5%	0	0
0.65	0.001	0.030	95.1%	94.8%	0	0	-0.006	0.032	97.6%	98.3%	0	0
0.70	0.000	0.032	95.0%	94.9%	0	0	-0.011	0.035	96.8%	97.6%	0	0
0.75	0.001	0.036	95.7%	95.5%	0	0	-0.015	0.038	96.6%	97.0%	0	0
0.80	-0.002	0.041	95.5%	95.4%	0	0	-0.023	0.044	95.1%	96.4%	0	0
0.85	0.000	0.047	95.5%	95.4%	0	0	-0.025	0.050	95.1%	96.1%	0	0
0.90	0.001	0.053	95.7%	95.7%	0	0	-0.029	0.057	95.4%	96.0%	0	0
0.95	0.000	0.062	95.8%	95.6%	0	0	-0.035	0.067	94.8%	95.4%	0	0
Shift in log-odds												
-2.5	-0.002	0.086	96.1%	96.1%	0	0	0.067	0.100	96.2%	96.8%	0	0
-2.0	-0.002	0.081	96.7%	97.1%	0	0	0.073	0.092	96.5%	97.3%	0	0
-1.5	-0.001	0.073	97.6%	97.4%	0	0	0.076	0.081	96.1%	97.6%	0	0
-1.0	-0.001	0.054	96.6%	96.5%	0	0	0.061	0.060	93.9%	96.8%	0	0
-0.5	-0.001	0.027	95.3%	95.0%	0	0	0.022	0.030	95.2%	97.9%	0	0
0.5	0.000	0.025	94.8%	94.6%	0	0	-0.011	0.026	97.9%	99.0%	0	0
1.0	0.000	0.030	94.9%	95.0%	0	0	-0.018	0.032	96.2%	97.7%	0	0
1.5	0.000	0.038	95.2%	95.3%	0	0	-0.024	0.041	94.9%	96.2%	0	0
2.0	-0.001	0.046	95.3%	95.1%	0	0	-0.028	0.050	94.5%	95.5%	0	0
2.5	-0.001	0.053	95.6%	95.3%	0	0	-0.033	0.058	94.2%	95.1%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: no point estimate was obtained.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Vaccine and infection

Table D.34: Network-TMLE for vaccine and infection, and the uniform random graph ($n = 500$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.009	0.034	49.9%	58.9%	0	0	-0.012	0.031	52.2%	62.2%	0	0
0.10	-0.007	0.029	53.6%	66.1%	0	0	-0.009	0.027	55.7%	68.0%	0	0
0.15	-0.005	0.025	57.9%	72.5%	0	0	-0.007	0.024	60.7%	74.3%	0	0
0.20	-0.004	0.022	63.3%	78.2%	0	0	-0.004	0.021	65.9%	79.9%	0	0
0.25	-0.002	0.020	69.1%	83.8%	2	2	-0.002	0.019	70.6%	84.9%	0	0
0.30	-0.001	0.018	74.1%	88.1%	1	1	-0.001	0.018	75.6%	88.4%	0	0
0.35	0.001	0.017	78.2%	90.5%	0	0	0.001	0.017	79.1%	90.0%	0	0
0.40	0.002	0.017	79.5%	90.7%	0	0	0.003	0.017	79.6%	90.0%	0	0
0.45	0.003	0.018	78.9%	90.0%	0	0	0.004	0.017	79.2%	89.1%	0	0
0.50	0.005	0.020	76.5%	87.7%	0	0	0.006	0.018	78.1%	87.8%	0	0
0.55	0.006	0.021	73.1%	84.4%	0	0	0.007	0.020	76.2%	85.6%	0	0
0.60	0.007	0.024	69.2%	79.9%	0	0	0.008	0.022	72.4%	82.7%	0	0
0.65	0.008	0.026	64.9%	75.6%	0	0	0.009	0.024	68.2%	79.4%	0	0
0.70	0.009	0.029	60.9%	70.4%	0	0	0.010	0.026	64.0%	74.2%	0	0
0.75	0.011	0.032	55.6%	65.4%	0	0	0.011	0.029	60.0%	69.5%	0	0
0.80	0.012	0.036	51.7%	59.7%	0	0	0.012	0.032	56.0%	64.9%	0	0
0.85	0.013	0.039	47.4%	54.6%	0	0	0.012	0.035	51.6%	59.7%	0	0
0.90	0.013	0.043	44.1%	49.6%	0	0	0.013	0.038	48.7%	54.4%	0	0
0.95	0.014	0.047	41.2%	45.3%	0	0	0.014	0.042	46.0%	50.9%	0	0
Shift in log-odds												
-2.5	-0.008	0.030	54.3%	65.7%	0	0	-0.010	0.027	58.2%	68.5%	0	0
-2.0	-0.007	0.027	57.1%	70.6%	0	0	-0.008	0.024	60.1%	72.3%	0	0
-1.5	-0.005	0.023	61.2%	76.3%	0	0	-0.007	0.022	63.1%	77.7%	0	0
-1.0	-0.004	0.020	65.3%	83.1%	0	0	-0.004	0.019	66.8%	83.2%	0	0
-0.5	-0.002	0.017	71.2%	87.7%	0	0	-0.003	0.017	71.3%	88.3%	0	0
0.5	0.002	0.014	78.1%	93.1%	0	0	0.003	0.014	77.9%	93.5%	0	0
1.0	0.004	0.015	76.2%	90.5%	0	0	0.005	0.015	76.4%	91.2%	0	0
1.5	0.006	0.018	69.9%	83.6%	0	0	0.007	0.018	72.2%	85.9%	0	0
2.0	0.007	0.022	62.0%	75.1%	0	0	0.009	0.022	66.4%	78.6%	0	0
2.5	0.009	0.027	55.7%	66.5%	0	0	0.010	0.026	60.7%	70.9%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.35: Network-TMLE for vaccine and infection, and the uniform random graph ($n = 1000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.020	0.028	43.3%	50.9%	0	0	-0.021	0.026	44.8%	53.2%	0	0
0.10	-0.017	0.023	45.1%	55.2%	0	0	-0.017	0.022	46.7%	57.6%	0	0
0.15	-0.014	0.020	48.6%	60.1%	0	0	-0.014	0.019	50.8%	63.3%	0	0
0.20	-0.012	0.018	53.7%	67.3%	0	0	-0.011	0.017	55.2%	69.5%	0	0
0.25	-0.009	0.017	59.1%	72.1%	0	0	-0.008	0.016	59.6%	74.9%	0	0
0.30	-0.006	0.015	65.8%	78.3%	0	0	-0.005	0.014	66.4%	80.9%	0	0
0.35	-0.004	0.015	71.7%	82.6%	0	0	-0.003	0.014	71.6%	84.6%	0	0
0.40	-0.001	0.014	74.9%	85.8%	0	0	0.000	0.014	75.1%	87.0%	0	0
0.45	0.001	0.014	77.8%	88.0%	0	0	0.002	0.014	76.9%	88.7%	0	0
0.50	0.003	0.015	77.3%	88.3%	0	0	0.004	0.014	76.6%	88.3%	0	0
0.55	0.006	0.016	76.4%	85.8%	0	0	0.006	0.015	73.7%	86.2%	0	0
0.60	0.008	0.017	72.7%	82.8%	0	0	0.008	0.016	70.4%	82.5%	0	0
0.65	0.010	0.019	68.2%	78.0%	0	0	0.009	0.017	66.1%	77.5%	0	0
0.70	0.011	0.021	63.0%	73.5%	0	0	0.011	0.019	61.8%	72.5%	0	0
0.75	0.013	0.023	58.7%	67.8%	0	0	0.012	0.021	58.3%	67.3%	0	0
0.80	0.015	0.026	55.2%	62.3%	0	0	0.013	0.022	54.2%	62.7%	0	0
0.85	0.017	0.028	51.5%	58.1%	0	0	0.015	0.024	50.6%	57.6%	0	0
0.90	0.018	0.031	49.0%	54.1%	0	0	0.016	0.026	48.7%	53.9%	0	0
0.95	0.020	0.034	46.3%	50.9%	0	0	0.017	0.028	46.8%	51.3%	0	0
Shift in log-odds												
-2.5	-0.016	0.024	49.9%	59.3%	0	0	-0.016	0.022	51.4%	61.9%	0	0
-2.0	-0.014	0.021	51.1%	62.7%	0	0	-0.013	0.020	52.8%	66.1%	0	0
-1.5	-0.011	0.019	53.3%	68.9%	0	0	-0.010	0.018	55.0%	70.8%	0	0
-1.0	-0.007	0.016	58.1%	75.2%	0	0	-0.007	0.016	59.3%	77.3%	0	0
-0.5	-0.004	0.014	63.3%	82.6%	0	0	-0.004	0.014	64.4%	83.2%	0	0
0.5	0.003	0.011	74.6%	91.5%	0	0	0.003	0.011	74.5%	91.4%	0	0
1.0	0.007	0.012	72.2%	88.5%	0	0	0.006	0.012	72.1%	88.3%	0	0
1.5	0.010	0.014	66.6%	82.0%	0	0	0.009	0.013	67.4%	83.2%	0	0
2.0	0.012	0.017	62.0%	73.7%	0	0	0.011	0.015	62.6%	75.7%	0	0
2.5	0.014	0.020	57.1%	67.5%	0	0	0.013	0.018	59.2%	69.2%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^S for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.36: Network-TMLE for vaccine and infection, and the uniform random graph ($n = 2000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.009	0.014	51.4%	62.5%	0	0	-0.007	0.014	56.0%	67.2%	0	0
0.10	-0.007	0.012	54.7%	67.1%	0	0	-0.006	0.012	57.0%	71.4%	0	0
0.15	-0.005	0.011	59.5%	73.1%	0	0	-0.005	0.010	59.7%	76.2%	0	0
0.20	-0.003	0.010	65.6%	79.9%	0	0	-0.003	0.009	64.2%	80.2%	0	0
0.25	-0.002	0.009	71.1%	84.9%	0	0	-0.003	0.008	68.4%	84.0%	0	0
0.30	-0.001	0.009	75.8%	88.4%	0	0	-0.002	0.008	72.5%	86.6%	0	0
0.35	0.000	0.008	79.7%	90.4%	0	0	-0.001	0.007	75.8%	88.9%	0	0
0.40	0.001	0.008	81.7%	91.3%	0	0	-0.001	0.007	78.0%	89.3%	0	0
0.45	0.002	0.009	81.9%	91.2%	0	0	0.000	0.007	78.9%	89.1%	0	0
0.50	0.003	0.009	80.6%	90.2%	0	0	0.000	0.007	79.2%	88.4%	0	0
0.55	0.003	0.010	78.7%	88.1%	0	0	0.001	0.008	77.4%	86.9%	0	0
0.60	0.004	0.010	75.3%	84.5%	0	0	0.001	0.008	75.1%	84.5%	0	0
0.65	0.004	0.011	72.3%	81.1%	0	0	0.001	0.009	72.5%	81.9%	0	0
0.70	0.005	0.012	68.3%	77.4%	0	0	0.001	0.009	69.7%	78.6%	0	0
0.75	0.005	0.013	65.2%	73.0%	0	0	0.001	0.010	66.9%	74.1%	0	0
0.80	0.005	0.014	61.4%	68.5%	0	0	0.001	0.010	63.6%	70.5%	0	0
0.85	0.005	0.015	58.5%	64.4%	0	0	0.001	0.011	60.8%	66.7%	0	0
0.90	0.005	0.016	55.4%	60.4%	0	0	0.001	0.012	58.4%	63.2%	0	0
0.95	0.006	0.017	52.8%	56.6%	0	0	0.001	0.013	56.3%	60.6%	0	0
Shift in log-odds												
-2.5	-0.007	0.013	56.5%	67.8%	0	0	-0.006	0.013	60.7%	73.9%	0	0
-2.0	-0.006	0.012	59.9%	72.5%	0	0	-0.005	0.012	62.9%	77.4%	0	0
-1.5	-0.004	0.011	61.8%	77.2%	0	0	-0.004	0.011	64.8%	80.8%	0	0
-1.0	-0.003	0.010	64.8%	82.7%	0	0	-0.002	0.009	67.3%	84.8%	0	0
-0.5	-0.001	0.008	67.8%	87.8%	0	0	-0.001	0.008	69.7%	88.4%	0	0
0.5	0.001	0.007	76.0%	92.2%	0	0	0.001	0.007	76.1%	93.0%	0	0
1.0	0.002	0.007	76.5%	91.3%	0	0	0.001	0.007	77.1%	91.5%	0	0
1.5	0.003	0.008	74.4%	87.8%	0	0	0.001	0.007	75.0%	88.1%	0	0
2.0	0.004	0.009	71.7%	81.5%	0	0	0.001	0.008	72.6%	83.0%	0	0
2.5	0.004	0.011	68.6%	75.9%	0	0	0.001	0.009	68.3%	77.8%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.37: Network-TMLE for vaccine and infection, and the eX-FLU network restricted by degree ($n = 467$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.040	0.074	52.7%	70.4%	0	0	-0.020	0.073	66.5%	82.4%	0	0
0.10	-0.049	0.068	46.1%	63.9%	0	0	-0.030	0.066	61.1%	79.8%	0	0
0.15	-0.056	0.067	41.5%	58.0%	0	0	-0.040	0.063	52.3%	73.1%	0	0
0.20	-0.062	0.066	40.5%	56.5%	0	0	-0.046	0.062	46.1%	66.0%	0	0
0.25	-0.064	0.066	42.6%	59.7%	0	0	-0.048	0.062	43.8%	63.1%	0	0
0.30	-0.061	0.066	47.7%	64.7%	0	0	-0.045	0.061	43.9%	63.0%	0	0
0.35	-0.058	0.065	53.3%	68.9%	0	0	-0.042	0.061	45.6%	64.3%	0	0
0.40	-0.051	0.065	58.9%	74.2%	0	0	-0.036	0.060	48.8%	66.5%	0	0
0.45	-0.043	0.064	61.5%	77.6%	0	0	-0.031	0.060	50.8%	67.9%	0	0
0.50	-0.034	0.063	65.0%	79.8%	0	0	-0.026	0.060	52.9%	70.1%	0	0
0.55	-0.024	0.063	67.0%	81.8%	0	0	-0.021	0.061	55.2%	70.7%	0	0
0.60	-0.014	0.064	67.3%	82.7%	0	0	-0.018	0.062	56.4%	70.3%	0	0
0.65	-0.004	0.066	66.2%	82.1%	0	0	-0.016	0.063	57.5%	70.2%	0	0
0.70	0.005	0.070	64.5%	81.0%	0	0	-0.014	0.065	56.8%	68.3%	0	0
0.75	0.015	0.074	61.3%	79.4%	0	0	-0.012	0.067	55.9%	67.0%	0	0
0.80	0.022	0.079	60.2%	76.9%	0	2	-0.011	0.068	54.9%	65.1%	0	0
0.85	0.029	0.084	58.4%	74.1%	0	6	-0.010	0.070	53.4%	62.8%	0	0
0.90	0.036	0.090	56.5%	71.5%	0	10	-0.009	0.072	51.6%	60.3%	0	0
0.95	0.040	0.095	55.7%	68.1%	0	14	-0.009	0.073	49.6%	57.9%	0	0
Shift in log-odds												
-2.5	-0.045	0.080	61.6%	78.9%	0	0	-0.008	0.063	65.4%	85.2%	-0.008	0.063
-2.0	-0.036	0.069	57.1%	78.5%	0	0	-0.008	0.058	62.4%	85.0%	-0.008	0.058
-1.5	-0.028	0.059	52.4%	78.1%	0	0	-0.009	0.054	58.1%	83.8%	-0.009	0.054
-1.0	-0.022	0.053	50.5%	78.2%	0	0	-0.010	0.051	53.7%	82.2%	-0.010	0.051
-0.5	-0.016	0.050	49.5%	79.6%	0	0	-0.011	0.050	50.2%	80.3%	-0.011	0.050
0.5	-0.008	0.051	53.1%	81.6%	0	0	-0.012	0.050	47.9%	77.2%	-0.012	0.050
1.0	-0.004	0.054	57.4%	82.7%	0	0	-0.014	0.052	50.1%	75.7%	-0.014	0.052
1.5	0.003	0.059	61.5%	83.1%	0	0	-0.012	0.054	53.2%	74.7%	-0.012	0.054
2.0	0.009	0.066	64.1%	81.7%	0	0	-0.012	0.057	55.7%	72.7%	-0.012	0.057
2.5	0.015	0.073	64.8%	79.9%	0	0	-0.012	0.061	56.8%	69.7%	-0.012	0.061

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained. The maximum degree for participants was restricted to be 22 or less.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^S for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.38: Network-TMLE for vaccine and infection, and the eX-FLU network unrestricted ($n = 467$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.048	0.103	46.0%	62.4%	0	0	-0.031	0.108	58.9%	75.1%	0	14
0.10	-0.048	0.096	42.4%	60.6%	0	0	-0.043	0.111	60.3%	80.6%	0	3
0.15	-0.050	0.090	38.8%	57.7%	0	0	-0.052	0.112	61.3%	83.3%	0	1
0.20	-0.046	0.084	39.0%	59.0%	0	0	-0.053	0.112	60.6%	83.4%	0	0
0.25	-0.047	0.081	49.6%	66.2%	0	0	-0.047	0.109	59.8%	81.6%	0	1
0.30	-0.051	0.082	65.2%	75.9%	0	0	-0.037	0.103	58.1%	79.0%	0	1
0.35	-0.051	0.080	72.7%	80.2%	0	0	-0.027	0.094	57.0%	77.7%	0	0
0.40	-0.043	0.079	75.6%	83.1%	0	0	-0.015	0.084	57.5%	77.4%	0	0
0.45	-0.035	0.077	77.4%	84.6%	0	1	-0.005	0.076	61.7%	79.3%	0	0
0.50	-0.028	0.077	79.1%	86.8%	0	1	0.000	0.071	68.0%	81.6%	0	0
0.55	-0.022	0.078	81.0%	88.3%	0	1	0.003	0.070	73.5%	83.2%	0	0
0.60	-0.016	0.080	82.7%	89.0%	0	2	0.004	0.072	74.8%	83.7%	0	0
0.65	-0.010	0.083	83.6%	89.7%	0	4	0.005	0.075	75.2%	83.5%	0	0
0.70	-0.002	0.087	83.6%	90.4%	0	4	0.007	0.078	73.6%	82.1%	0	1
0.75	0.006	0.091	83.3%	90.0%	0	3	0.007	0.081	71.1%	79.6%	0	1
0.80	0.016	0.095	81.4%	89.2%	1	4	0.010	0.084	68.1%	76.4%	0	2
0.85	0.025	0.099	79.9%	87.8%	1	4	0.012	0.085	64.4%	72.6%	0	1
0.90	0.029	0.102	79.0%	85.8%	0	7	0.013	0.086	59.6%	68.2%	0	1
0.95	0.032	0.104	78.1%	83.5%	1	12	0.015	0.085	54.1%	61.7%	0	2
Shift in log-odds												
-2.5	-0.071	0.093	69.7%	80.0%	0	0	-0.034	0.100	62.5%	83.2%	0	2
-2.0	-0.062	0.085	67.5%	80.5%	0	0	-0.026	0.086	55.9%	82.5%	0	0
-1.5	-0.040	0.074	58.2%	78.1%	0	0	-0.017	0.075	48.8%	79.7%	0	0
-1.0	-0.020	0.065	47.8%	76.8%	0	0	-0.010	0.066	43.1%	76.5%	0	0
-0.5	-0.008	0.059	42.6%	77.2%	0	0	-0.005	0.061	40.1%	73.7%	0	0
0.5	0.010	0.054	50.7%	80.2%	0	0	0.003	0.055	46.8%	75.4%	0	0
1.0	0.018	0.058	63.4%	84.8%	0	0	0.005	0.056	55.8%	77.6%	0	0
1.5	0.021	0.066	77.1%	88.0%	0	0	0.004	0.060	64.6%	79.6%	0	0
2.0	0.020	0.077	83.6%	89.3%	1	2	0.001	0.066	68.9%	80.3%	0	0
2.5	0.019	0.085	84.4%	89.6%	2	3	-0.001	0.072	69.6%	79.6%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^S for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.39: Network-TMLE for vaccine and infection, and the clustered power-law random graph restricted by degree ($n = 500$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.061	0.070	29.1%	37.4%	0	0	-0.063	0.066	28.4%	36.6%	0	0
0.10	-0.048	0.065	32.8%	43.5%	0	0	-0.051	0.061	31.1%	42.7%	0	0
0.15	-0.035	0.061	37.4%	49.8%	0	0	-0.038	0.057	35.0%	48.5%	0	0
0.20	-0.025	0.058	42.5%	55.8%	0	0	-0.029	0.054	38.5%	55.4%	0	0
0.25	-0.015	0.055	47.0%	62.7%	0	0	-0.019	0.051	44.3%	61.2%	0	0
0.30	-0.007	0.052	51.8%	66.7%	0	0	-0.011	0.049	47.7%	65.6%	0	0
0.35	-0.001	0.050	53.8%	69.3%	0	0	-0.004	0.047	49.8%	68.8%	0	0
0.40	0.006	0.049	55.5%	71.6%	0	0	0.002	0.046	51.9%	70.7%	0	0
0.45	0.012	0.048	55.7%	72.2%	0	0	0.008	0.045	53.1%	70.7%	0	0
0.50	0.016	0.048	55.1%	71.6%	0	0	0.013	0.045	54.1%	70.1%	0	0
0.55	0.022	0.049	53.4%	68.3%	0	0	0.018	0.045	53.3%	68.9%	0	0
0.60	0.027	0.050	51.5%	64.3%	0	0	0.022	0.046	52.9%	66.8%	0	0
0.65	0.030	0.051	48.6%	60.3%	0	0	0.026	0.047	51.3%	63.8%	0	0
0.70	0.035	0.053	45.0%	56.4%	0	0	0.030	0.049	48.7%	60.8%	0	1
0.75	0.038	0.056	43.5%	51.8%	0	0	0.033	0.051	47.3%	57.6%	0	1
0.80	0.042	0.059	40.5%	47.8%	0	0	0.036	0.054	45.1%	54.3%	0	1
0.85	0.045	0.063	38.4%	44.8%	0	0	0.039	0.056	43.6%	51.3%	0	1
0.90	0.048	0.066	36.4%	42.0%	0	0	0.041	0.060	42.2%	48.0%	0	1
0.95	0.050	0.071	35.5%	39.5%	0	0	0.044	0.063	40.5%	46.1%	0	1
Shift in log-odds												
-2.5	-0.041	0.065	37.1%	49.6%	0	0	-0.050	0.059	32.2%	44.3%	0	0
-2.0	-0.034	0.061	39.3%	54.7%	0	0	-0.042	0.056	34.5%	48.8%	0	0
-1.5	-0.028	0.056	40.9%	58.8%	0	0	-0.034	0.053	36.5%	53.3%	0	0
-1.0	-0.021	0.052	42.3%	62.5%	0	0	-0.025	0.050	38.9%	59.3%	0	0
-0.5	-0.012	0.049	44.0%	66.6%	0	0	-0.014	0.047	40.7%	65.8%	0	0
0.5	0.006	0.044	46.0%	70.1%	0	0	0.005	0.043	44.6%	70.8%	0	0
1.0	0.015	0.045	46.6%	68.2%	0	0	0.014	0.043	46.4%	68.5%	0	0
1.5	0.025	0.047	45.9%	62.9%	0	0	0.023	0.044	45.8%	64.0%	0	0
2.0	0.031	0.050	44.6%	57.2%	0	0	0.028	0.046	45.8%	59.8%	0	0
2.5	0.038	0.055	42.8%	52.3%	0	0	0.034	0.049	45.1%	55.9%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained. The maximum degree for participants was restricted to be 18 or less.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^S for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.40: Network-TMLE for vaccine and infection, and the clustered power-law random graph unrestricted ($n = 500$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.014	0.110	39.2%	46.9%	0	2	-0.025	0.103	37.8%	45.7%	0	0
0.10	-0.003	0.102	44.2%	55.6%	0	0	-0.018	0.089	38.8%	50.4%	0	0
0.15	0.005	0.094	49.4%	63.5%	0	0	-0.012	0.078	41.4%	55.7%	0	0
0.20	0.006	0.081	48.6%	65.1%	0	0	-0.008	0.069	44.7%	61.4%	0	0
0.25	0.005	0.068	46.8%	64.9%	0	0	-0.006	0.061	49.4%	67.8%	0	0
0.30	0.006	0.059	49.0%	67.8%	0	0	-0.006	0.055	56.7%	74.2%	0	0
0.35	0.006	0.053	54.3%	73.0%	0	0	-0.008	0.049	62.9%	79.7%	0	0
0.40	0.008	0.049	57.7%	77.2%	0	0	-0.008	0.045	67.5%	83.5%	0	0
0.45	0.010	0.047	62.7%	80.3%	0	0	-0.007	0.043	71.4%	84.9%	0	0
0.50	0.011	0.046	65.1%	81.2%	0	0	-0.006	0.041	72.6%	85.1%	0	0
0.55	0.012	0.046	66.4%	81.4%	0	0	-0.004	0.040	73.0%	84.2%	0	0
0.60	0.013	0.047	66.2%	79.9%	1	1	-0.002	0.040	72.4%	82.9%	0	0
0.65	0.015	0.048	65.1%	78.2%	0	0	0.001	0.040	70.0%	81.6%	0	0
0.70	0.016	0.050	63.7%	76.3%	0	0	0.004	0.041	67.4%	78.7%	0	0
0.75	0.018	0.053	62.2%	74.1%	0	0	0.007	0.042	65.0%	75.9%	0	0
0.80	0.019	0.055	60.2%	70.6%	0	0	0.008	0.044	61.8%	72.1%	0	0
0.85	0.020	0.057	58.1%	68.0%	0	0	0.011	0.046	59.3%	68.3%	0	0
0.90	0.021	0.060	56.7%	65.2%	0	0	0.013	0.048	57.9%	65.8%	0	0
0.95	0.021	0.062	54.9%	62.3%	0	0	0.014	0.050	55.6%	62.7%	0	0
Shift in log-odds												
-2.5	-0.009	0.088	46.1%	59.4%	0	0	-0.020	0.085	40.6%	53.6%	0	0
-2.0	-0.004	0.083	51.0%	65.3%	0	0	-0.016	0.077	41.8%	57.3%	0	0
-1.5	0.000	0.076	54.6%	71.4%	0	0	-0.012	0.069	42.2%	61.3%	0	0
-1.0	0.000	0.066	55.5%	74.4%	0	0	-0.008	0.060	43.1%	66.6%	0	0
-0.5	-0.003	0.053	47.5%	73.6%	0	0	-0.005	0.052	44.6%	71.8%	0	0
0.5	0.000	0.040	51.6%	79.2%	0	0	0.000	0.040	52.6%	78.7%	0	0
1.0	0.004	0.039	56.2%	79.7%	0	0	0.002	0.038	57.5%	79.8%	0	0
1.5	0.006	0.041	58.6%	78.1%	0	0	0.003	0.039	59.6%	77.7%	0	0
2.0	0.010	0.044	60.6%	75.8%	0	0	0.006	0.040	60.2%	74.9%	0	0
2.5	0.012	0.047	60.3%	73.3%	0	0	0.008	0.043	59.9%	71.4%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^S for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.41: Network-TMLE for vaccine and infection, and the clustered power-law random graph restricted by degree ($n = 1000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.045	0.057	39.7%	53.3%	0	0	-0.041	0.056	43.3%	57.8%	0	0
0.10	-0.035	0.051	42.5%	56.8%	0	0	-0.034	0.050	42.3%	59.2%	0	0
0.15	-0.027	0.047	45.9%	61.4%	0	0	-0.028	0.046	42.6%	61.8%	0	0
0.20	-0.020	0.044	49.4%	65.7%	0	0	-0.022	0.043	45.8%	63.6%	0	0
0.25	-0.012	0.042	54.4%	70.8%	0	0	-0.014	0.040	50.1%	67.7%	0	0
0.30	-0.005	0.041	58.7%	73.7%	0	0	-0.008	0.039	53.5%	70.8%	0	0
0.35	0.000	0.040	60.8%	74.8%	0	0	-0.004	0.038	56.1%	71.9%	0	0
0.40	0.007	0.040	61.9%	74.4%	0	0	0.002	0.039	59.2%	73.1%	0	0
0.45	0.012	0.041	62.3%	73.6%	0	0	0.008	0.040	60.3%	73.1%	0	0
0.50	0.017	0.042	60.7%	71.2%	0	0	0.013	0.041	60.7%	72.0%	0	0
0.55	0.021	0.044	59.2%	69.5%	0	0	0.016	0.043	60.5%	70.6%	0	0
0.60	0.025	0.046	56.4%	66.3%	0	0	0.020	0.045	59.2%	69.0%	0	0
0.65	0.028	0.048	54.4%	63.1%	0	0	0.024	0.046	57.6%	65.8%	0	0
0.70	0.032	0.051	51.2%	59.7%	0	0	0.028	0.049	55.3%	63.0%	0	0
0.75	0.034	0.053	48.9%	55.7%	0	0	0.031	0.051	52.9%	59.8%	0	0
0.80	0.036	0.055	46.6%	53.3%	0	0	0.033	0.053	50.4%	56.9%	0	0
0.85	0.038	0.058	44.9%	50.7%	0	0	0.035	0.055	48.2%	54.4%	0	0
0.90	0.039	0.060	42.8%	48.0%	0	0	0.037	0.058	46.7%	51.8%	0	0
0.95	0.040	0.063	41.4%	45.7%	0	0	0.038	0.060	45.1%	49.0%	0	0
Shift in log-odds												
-2.5	-0.034	0.055	45.4%	60.9%	0	0	-0.031	0.052	45.4%	63.1%	0	0
-2.0	-0.029	0.052	46.3%	63.5%	0	0	-0.027	0.049	44.5%	64.5%	0	0
-1.5	-0.023	0.048	45.7%	65.5%	0	0	-0.022	0.046	44.4%	65.5%	0	0
-1.0	-0.017	0.044	43.3%	66.3%	0	0	-0.017	0.042	42.8%	67.4%	0	0
-0.5	-0.010	0.041	43.2%	67.9%	0	0	-0.010	0.040	43.1%	69.6%	0	0
0.5	0.004	0.037	45.3%	70.4%	0	0	0.002	0.036	46.6%	70.0%	0	0
1.0	0.011	0.037	48.1%	68.5%	0	0	0.008	0.036	48.8%	69.5%	0	0
1.5	0.017	0.039	51.0%	67.6%	0	0	0.014	0.038	52.6%	69.1%	0	0
2.0	0.021	0.042	53.3%	65.8%	0	0	0.018	0.042	57.1%	69.1%	0	0
2.5	0.026	0.047	54.0%	63.5%	0	0	0.023	0.046	58.3%	67.0%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained. The maximum degree for participants was restricted to be 22 or less.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^S for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.42: Network-TMLE for vaccine and infection, and the clustered power-law random graph unrestricted ($n = 1000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.085	0.075	70.2%	76.5%	0	0	-0.046	0.075	63.3%	72.9%	0	0
0.10	-0.082	0.065	76.2%	82.4%	0	0	-0.054	0.065	69.3%	79.0%	0	0
0.15	-0.075	0.058	80.6%	87.0%	0	0	-0.051	0.058	71.2%	80.8%	0	0
0.20	-0.070	0.053	84.5%	89.8%	0	0	-0.049	0.054	73.9%	82.6%	0	0
0.25	-0.046	0.053	79.8%	87.6%	0	0	-0.041	0.050	74.3%	84.0%	0	0
0.30	-0.008	0.046	62.8%	79.3%	0	0	-0.026	0.046	70.1%	82.5%	0	0
0.35	0.003	0.043	64.5%	80.1%	0	0	-0.011	0.042	66.6%	80.3%	0	0
0.40	0.008	0.043	69.3%	82.6%	0	0	-0.002	0.041	66.8%	79.6%	0	0
0.45	0.012	0.044	71.9%	83.4%	0	0	0.004	0.042	67.7%	79.7%	0	0
0.50	0.016	0.046	74.1%	83.7%	0	0	0.008	0.043	66.9%	79.2%	0	0
0.55	0.020	0.048	74.5%	83.3%	0	0	0.012	0.044	66.8%	77.3%	0	0
0.60	0.023	0.050	74.4%	82.0%	0	0	0.016	0.046	64.4%	75.5%	0	0
0.65	0.026	0.052	73.4%	80.3%	0	0	0.019	0.047	63.4%	73.1%	0	0
0.70	0.029	0.054	71.2%	78.7%	0	0	0.022	0.048	61.6%	70.7%	0	0
0.75	0.031	0.056	68.2%	75.7%	0	0	0.024	0.049	58.1%	67.4%	0	0
0.80	0.032	0.058	65.2%	72.6%	0	0	0.026	0.051	55.8%	63.4%	0	0
0.85	0.034	0.059	62.1%	68.9%	0	0	0.028	0.052	53.4%	60.2%	0	0
0.90	0.035	0.061	57.8%	65.0%	0	0	0.029	0.053	51.0%	57.1%	0	0
0.95	0.035	0.063	54.2%	60.6%	0	0	0.029	0.054	48.9%	54.6%	0	0
Shift in log-odds												
-2.5	-0.073	0.067	79.6%	84.6%	0	0	-0.004	0.067	54.0%	70.1%	0	0
-2.0	-0.068	0.063	81.8%	86.1%	0	0	-0.002	0.062	50.9%	70.6%	0	0
-1.5	-0.065	0.059	83.0%	88.4%	0	0	-0.001	0.056	46.5%	69.6%	0	0
-1.0	-0.062	0.054	85.0%	89.7%	0	0	-0.001	0.051	44.0%	69.7%	0	0
-0.5	-0.044	0.053	78.4%	87.2%	0	0	-0.001	0.046	43.4%	69.9%	0	0
0.5	0.003	0.038	46.6%	74.3%	0	0	0.000	0.038	45.4%	72.2%	0	0
1.0	0.007	0.039	57.9%	80.6%	0	0	0.003	0.037	51.0%	73.5%	0	0
1.5	0.011	0.043	70.8%	84.8%	0	0	0.005	0.039	57.3%	74.2%	0	0
2.0	0.016	0.048	77.2%	85.8%	0	0	0.007	0.042	61.5%	74.7%	0	0
2.5	0.019	0.053	78.0%	85.3%	0	0	0.009	0.045	63.0%	72.6%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^S for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.43: Network-TMLE for vaccine and infection, and the clustered power-law random graph restricted by degree ($n = 2000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.074	0.059	27.4%	33.3%	0	0	-0.075	0.058	26.8%	32.4%	0	0
0.10	-0.061	0.051	27.2%	34.1%	0	0	-0.062	0.051	27.2%	34.3%	0	0
0.15	-0.049	0.046	29.9%	38.4%	0	0	-0.049	0.046	29.7%	38.7%	0	0
0.20	-0.038	0.042	34.6%	45.4%	0	0	-0.038	0.041	33.1%	44.4%	0	0
0.25	-0.030	0.038	39.0%	51.0%	0	0	-0.030	0.038	37.6%	49.8%	0	0
0.30	-0.022	0.035	45.0%	57.2%	0	0	-0.021	0.035	43.8%	56.5%	0	0
0.35	-0.015	0.033	51.1%	63.7%	0	0	-0.014	0.032	50.0%	63.1%	0	0
0.40	-0.008	0.031	55.5%	68.0%	0	0	-0.007	0.030	55.4%	69.0%	0	0
0.45	-0.003	0.030	59.0%	71.6%	0	0	-0.002	0.029	59.2%	72.6%	0	0
0.50	0.002	0.029	60.9%	73.1%	0	0	0.003	0.028	61.3%	73.9%	0	0
0.55	0.005	0.028	61.3%	73.4%	0	0	0.007	0.027	62.3%	73.9%	0	0
0.60	0.009	0.028	61.8%	73.1%	0	0	0.011	0.027	61.8%	73.3%	0	0
0.65	0.011	0.028	60.8%	71.1%	0	0	0.013	0.027	59.8%	71.2%	0	0
0.70	0.012	0.028	60.0%	69.4%	0	0	0.015	0.027	58.9%	69.4%	0	0
0.75	0.014	0.028	57.9%	67.2%	0	0	0.017	0.028	56.4%	66.9%	0	0
0.80	0.016	0.029	56.0%	64.3%	0	0	0.019	0.029	54.3%	63.0%	0	0
0.85	0.016	0.029	54.7%	62.8%	0	0	0.019	0.029	53.7%	60.7%	0	0
0.90	0.016	0.030	53.4%	61.1%	0	0	0.020	0.030	51.9%	59.1%	0	0
0.95	0.017	0.030	52.5%	59.6%	0	0	0.020	0.031	50.7%	56.9%	0	0
Shift in log-odds												
-2.5	-0.053	0.049	32.7%	43.0%	0	0	-0.053	0.048	30.1%	40.2%	0	0
-2.0	-0.045	0.045	33.7%	47.2%	0	0	-0.044	0.044	30.4%	43.4%	0	0
-1.5	-0.034	0.040	35.5%	51.4%	0	0	-0.033	0.040	31.7%	48.8%	0	0
-1.0	-0.024	0.036	36.2%	55.2%	0	0	-0.024	0.036	33.8%	52.3%	0	0
-0.5	-0.014	0.033	38.5%	60.0%	0	0	-0.014	0.033	36.7%	59.2%	0	0
0.5	0.002	0.027	43.8%	67.2%	0	0	0.003	0.028	43.3%	67.0%	0	0
1.0	0.008	0.026	47.6%	66.8%	0	0	0.010	0.026	45.5%	65.6%	0	0
1.5	0.012	0.025	49.4%	66.9%	0	0	0.015	0.025	46.7%	63.5%	0	0
2.0	0.014	0.025	52.4%	65.9%	0	0	0.018	0.026	48.9%	62.7%	0	0
2.5	0.016	0.026	53.4%	64.0%	0	0	0.020	0.026	49.8%	61.4%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained. The maximum degree for participants was restricted to be 22 or less.

* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^s for both nuisance models.

† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

Table D.44: Network-TMLE for vaccine and infection, and the clustered power-law random graph unrestricted ($n = 2000$)

	Correctly Specified Models*						Flexible Models*					
			Coverage†		Non-informative†				Coverage†		Non-informative†	
	Bias	ESE	Direct	Latent	Direct	Latent	Bias	ESE	Direct	Latent	Direct	Latent
Proportion												
0.05	-0.094	0.065	21.8%	27.7%	0	0	-0.098	0.060	20.8%	26.0%	0	0
0.10	-0.086	0.060	26.9%	32.9%	0	0	-0.086	0.054	23.6%	30.1%	0	0
0.15	-0.071	0.053	32.7%	39.9%	0	0	-0.073	0.050	33.9%	41.2%	0	0
0.20	-0.056	0.048	40.3%	48.1%	0	0	-0.058	0.047	48.3%	56.0%	0	0
0.25	-0.041	0.043	45.6%	55.3%	0	0	-0.041	0.043	60.0%	67.8%	0	0
0.30	-0.027	0.039	50.8%	60.8%	0	0	-0.026	0.040	66.7%	74.8%	0	0
0.35	-0.017	0.037	60.9%	70.9%	0	0	-0.014	0.036	68.7%	78.5%	0	0
0.40	-0.008	0.036	70.8%	79.9%	0	0	-0.003	0.033	67.2%	78.8%	0	0
0.45	-0.001	0.035	77.8%	85.1%	0	0	0.004	0.030	64.2%	77.7%	0	0
0.50	0.005	0.034	80.9%	87.5%	0	0	0.009	0.029	62.4%	77.1%	0	0
0.55	0.011	0.033	81.4%	88.5%	0	0	0.013	0.028	60.6%	74.3%	0	0
0.60	0.015	0.032	78.9%	86.9%	0	0	0.018	0.028	57.7%	71.1%	0	0
0.65	0.019	0.031	74.0%	82.9%	0	0	0.021	0.029	54.7%	67.9%	0	0
0.70	0.022	0.030	65.6%	77.1%	0	0	0.023	0.029	52.6%	63.5%	0	0
0.75	0.025	0.030	57.2%	69.0%	0	0	0.026	0.030	50.0%	59.7%	0	0
0.80	0.027	0.030	52.4%	62.4%	0	0	0.027	0.030	47.7%	57.0%	0	0
0.85	0.028	0.031	48.5%	57.9%	0	0	0.028	0.031	46.4%	53.8%	0	0
0.90	0.029	0.032	45.9%	53.5%	0	0	0.028	0.032	44.9%	51.6%	0	0
0.95	0.029	0.032	43.9%	50.8%	0	0	0.028	0.032	43.6%	49.7%	0	0
Shift in log-odds												
-2.5	-0.061	0.058	52.3%	57.6%	0	0	-0.056	0.049	31.2%	42.7%	0	0
-2.0	-0.057	0.055	60.2%	66.8%	0	0	-0.046	0.045	33.3%	46.8%	0	0
-1.5	-0.049	0.050	66.6%	72.7%	0	0	-0.035	0.041	35.0%	52.1%	0	0
-1.0	-0.036	0.044	67.8%	77.3%	0	0	-0.022	0.037	37.0%	57.3%	0	0
-0.5	-0.016	0.035	52.9%	71.3%	0	0	-0.011	0.033	38.3%	64.3%	0	0
0.5	0.009	0.027	41.7%	69.1%	0	0	0.008	0.027	41.8%	68.3%	0	0
1.0	0.015	0.025	44.1%	68.6%	0	0	0.015	0.025	43.0%	65.8%	0	0
1.5	0.020	0.025	46.5%	67.6%	0	0	0.021	0.025	43.7%	61.9%	0	0
2.0	0.023	0.026	49.8%	66.1%	0	0	0.024	0.026	44.4%	59.8%	0	0
2.5	0.026	0.028	50.0%	63.4%	0	0	0.027	0.027	44.2%	56.3%	0	0

Network-TMLE: targeted maximum likelihood estimation for dependent data, ESE: empirical standard error, Coverage: 95% confidence interval coverage of the true parameter, Non-informative: the lower confidence limit was less than 0 and the upper confidence limit was greater than 1, or no point estimate was obtained.
* Correctly specified models refer to both nuisance models (exposure and outcome) being correctly specified in the simulation. Flexible models refer to the flexible approach to modeling W^S for both nuisance models.
† Direct refers to the direct-transmission only variance estimator, and Latent refers to the extension of the variance estimator allowing for latent dependence.

REFERENCES

1. Sofrygin O, van der Laan MJ. Semi-Parametric Estimation and Inference for the Mean Outcome of the Single Time-Point Intervention in a Causally Connected Population. *Journal of Causal Inference.* 2017;5(1):20160003.
2. Aiello AE, Simanek AM, Eisenberg MC, et al. Design and methods of a social network isolation study for reducing respiratory infection transmission: The eX-FLU cluster randomized trial. *Epidemics.* 2016;15:38-55.