Simulation Result For Three-Level Intercept Model With Low Prevalence

The mean prevalence for this simulation is 12 %

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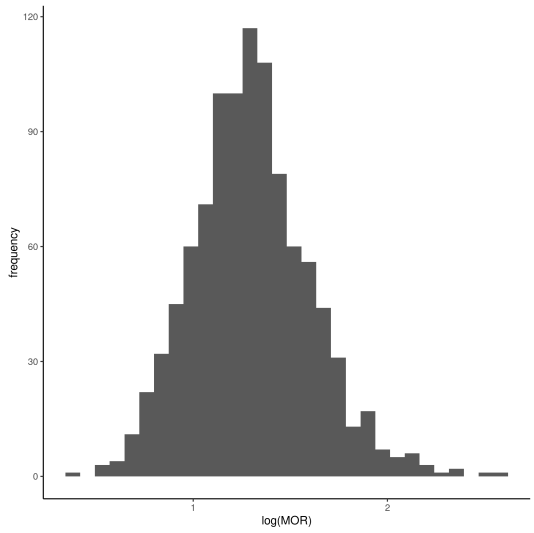
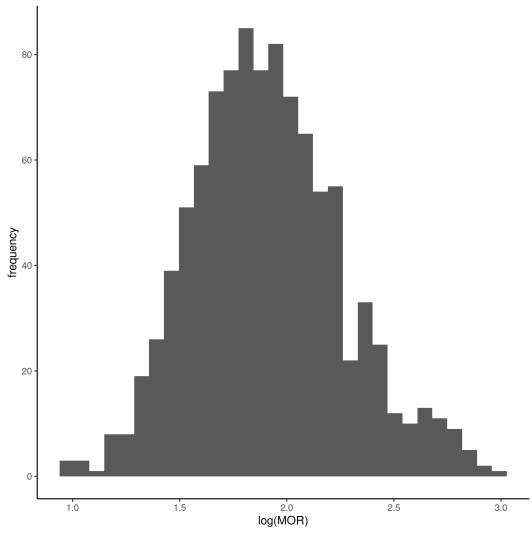
Histograms for $log(\widehat{MOR})$

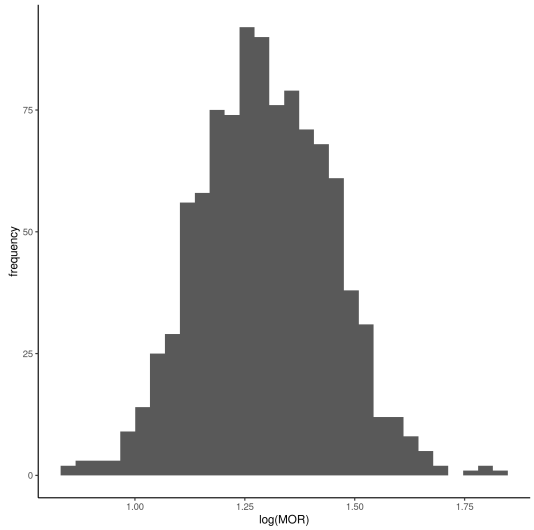


(a) MOR_1

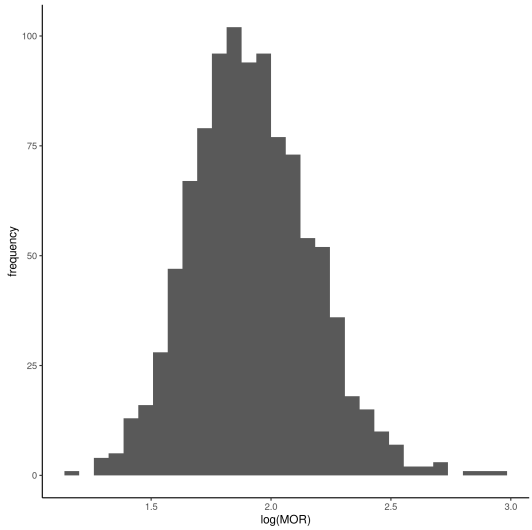


(b) MOR_2

Figure 1: Hospitals = 20, Doctors = 10, Patients = 5

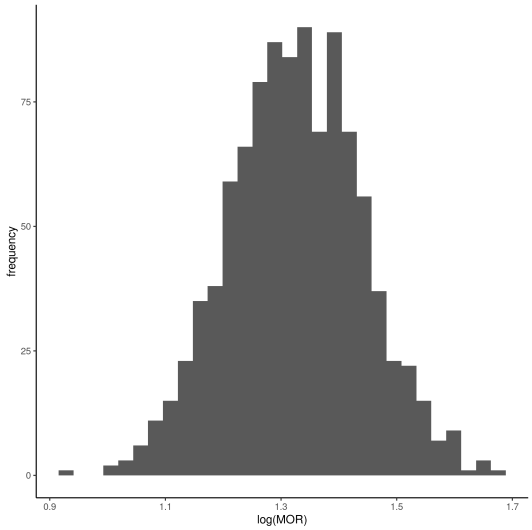


(a) MOR_1

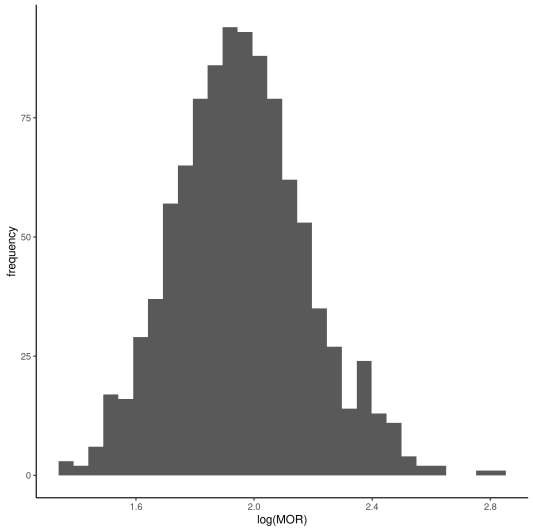


(b) MOR_2

Figure 2: Hospitals = 20, Doctors = 10, Patients = 15

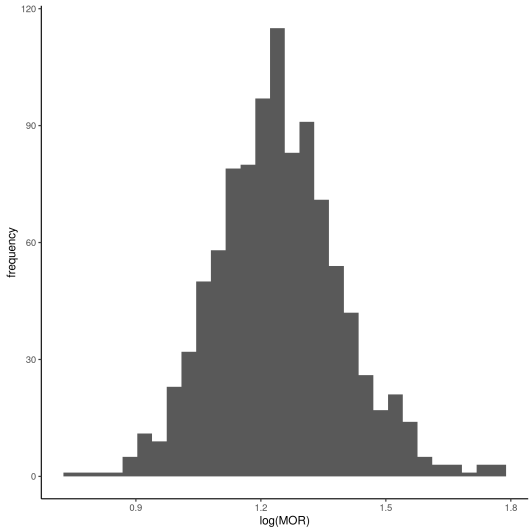


(a) MOR_1

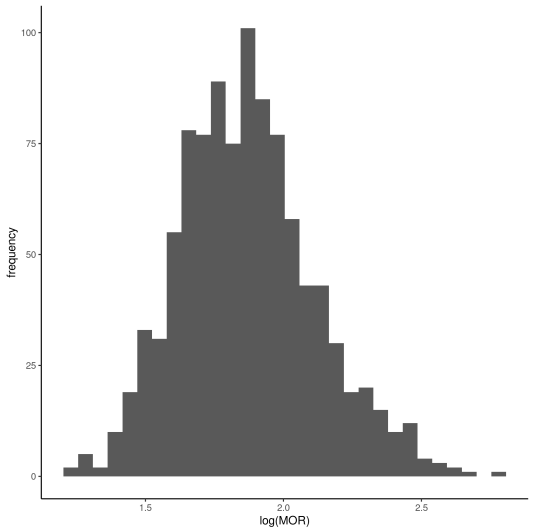


(b) MOR_2

Figure 3: Hospitals = 20, Doctors = 10, Patients = 30

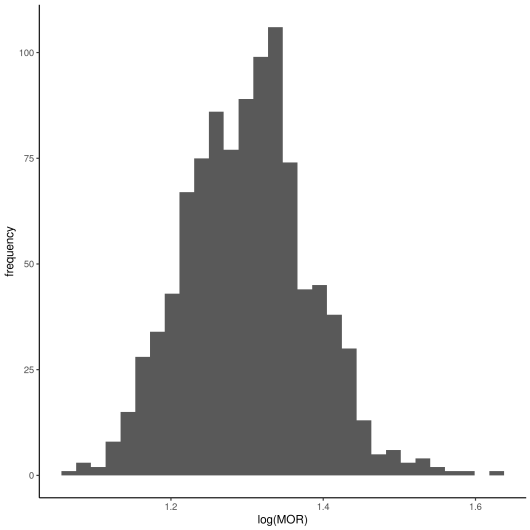


(a) MOR_1

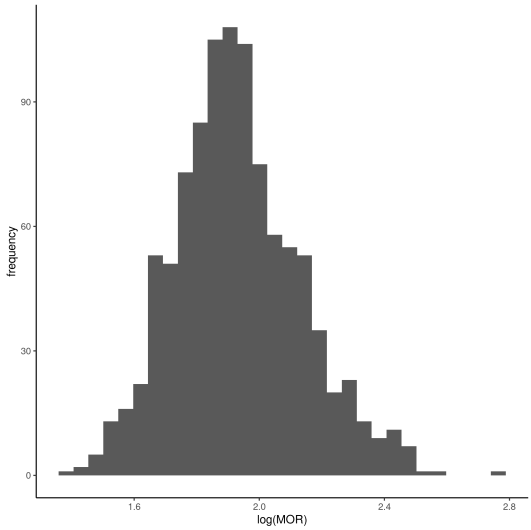


(b) MOR_2

Figure 4: Hospitals = 20, Doctors = 30, Patients = 5

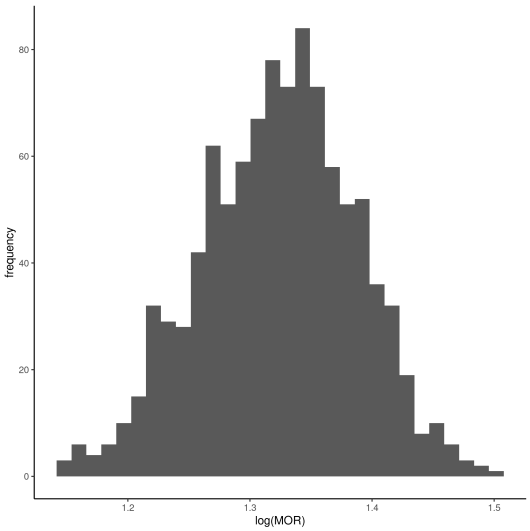


(a) MOR_1

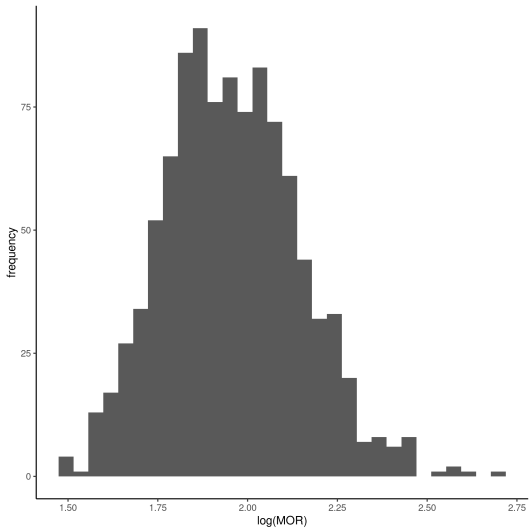


(b) MOR_2

Figure 5: Hospitals = 20, Doctors = 30, Patients = 15

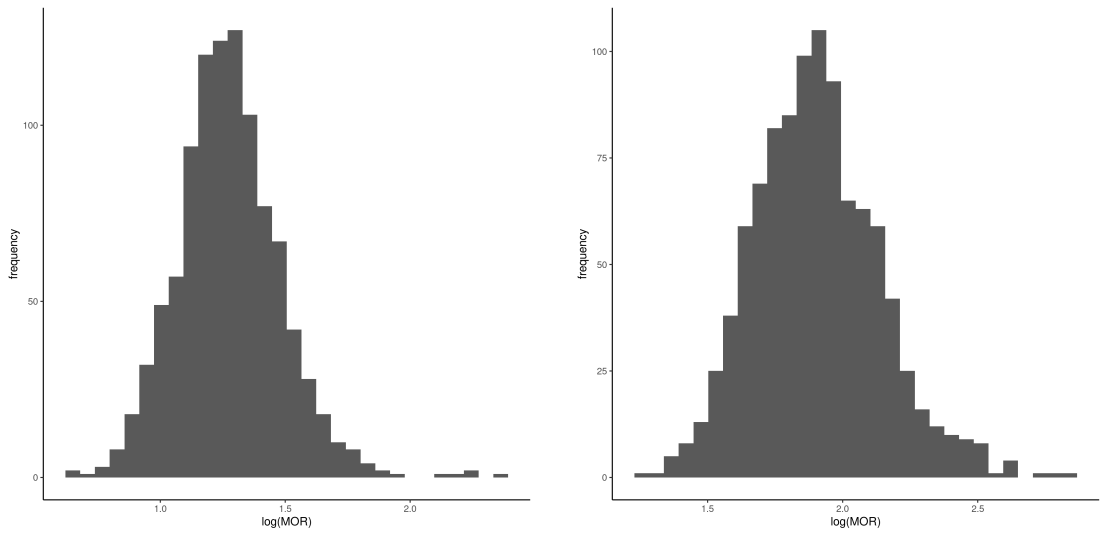


(a) MOR_1



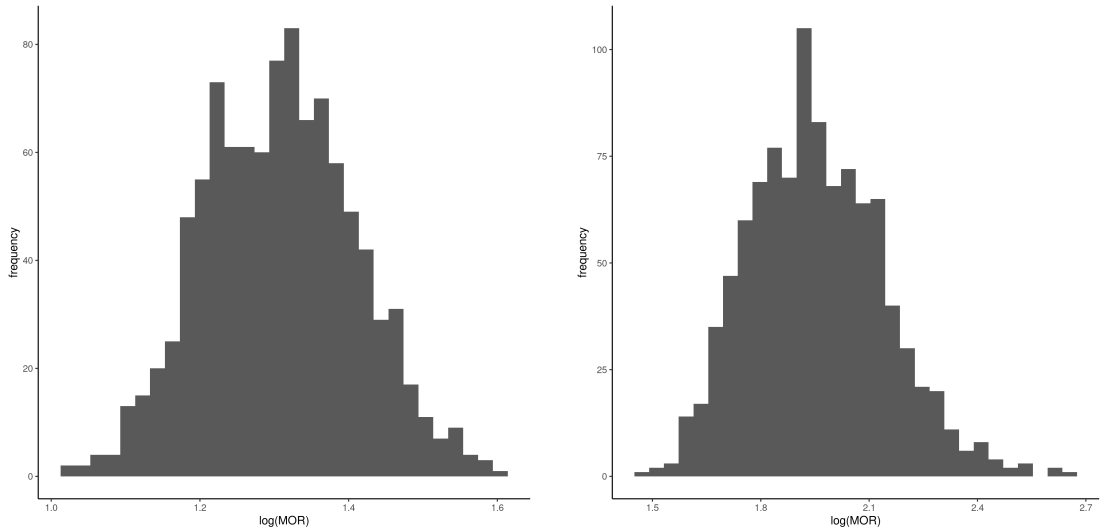
(b) MOR_2

Figure 6: Hospitals = 20, Doctors = 30, Patients = 30



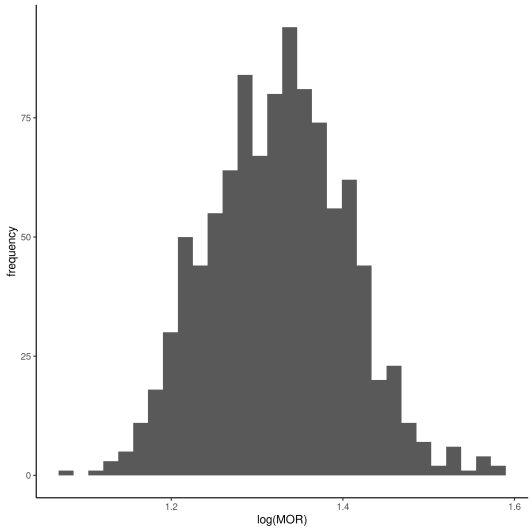
(a) MOR_1 (b) MOR_2

Figure 7: Hospitals = 40, Doctors = 10, Patients = 5

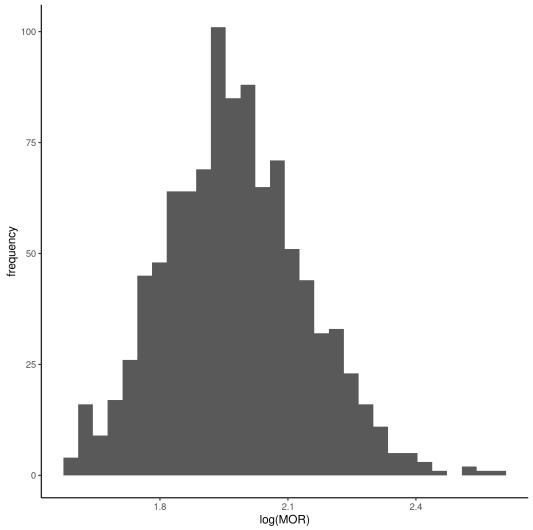


(a) MOR_1 (b) MOR_2

Figure 8: Hospitals = 40, Doctors = 10, Patients = 15

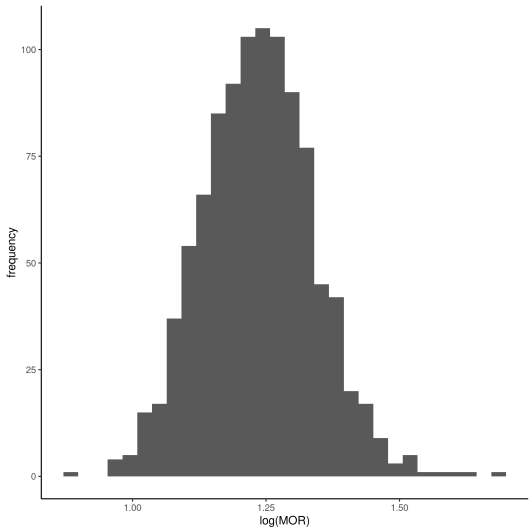


(a) MOR_1

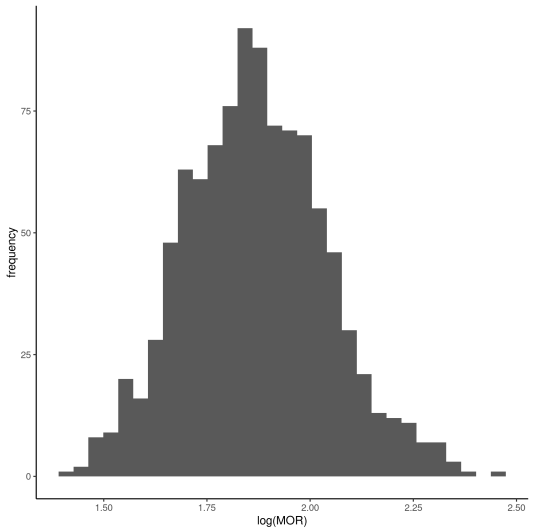


(b) MOR_2

Figure 9: Hospitals = 40, Doctors = 10, Patients = 30

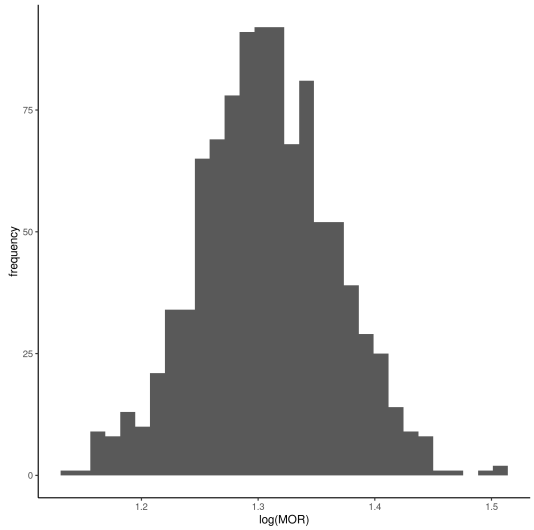


(a) MOR_1

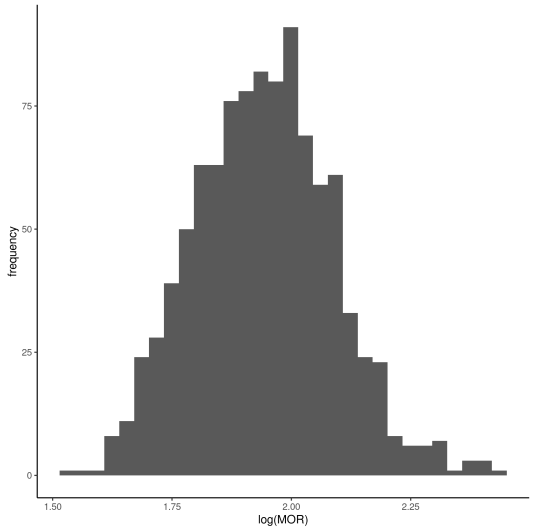


(b) MOR_2

Figure 10: Hospitals = 40, Doctors = 30, Patients = 5

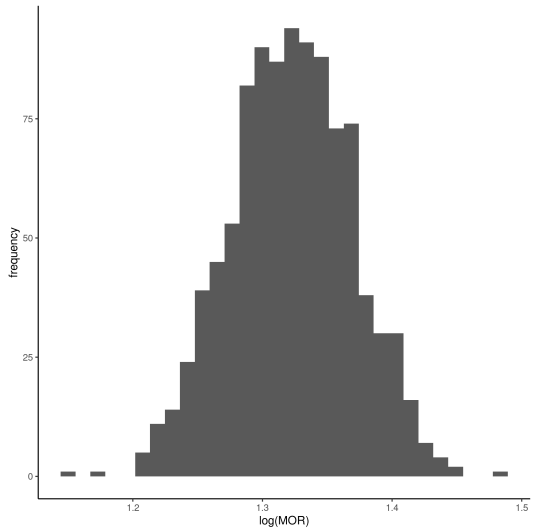


(a) MOR_1

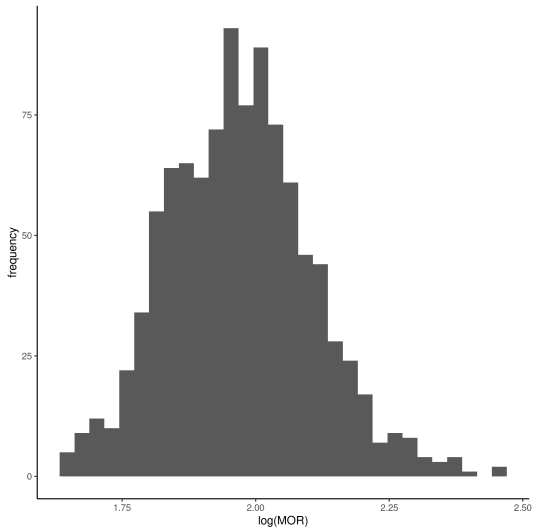


(b) MOR_2

Figure 11: Hospitals = 40, Doctors = 30, Patients = 15



(a) MOR_1



(b) MOR_2

Figure 12: Hospitals = 40, Doctors = 30, Patients = 30

Simulation Result Table for MOR of Second Level

L[1]	M[2]	N[3]	$\widehat{\beta_0}$	$\widehat{\beta_1}$	$\widehat{\beta_2}$	$\widehat{\sigma^2_{u_{jk}}}$	$\widehat{\sigma^2_{v_k}}$	$\widehat{MOR}_1$	Rel. Bias (%)	$\widehat{SE}_{MOR}$	Sim. $\widehat{SE}_{MOR}$	Ratio[4]	Coverage[5] (95%)	Model Conv[6]
20	10	5	-4.12	1.75	0.69	1.96	2.18	3.85	-0.18	1.34	1.35	0.99	0.94	0.98
20	10	15	-4.09	1.74	0.67	1.87	2.24	3.70	-3.99	1.15	1.16	0.99	0.91	1.00
20	10	30	-4.08	1.75	0.67	1.94	2.32	3.79	-1.77	1.12	1.12	1.00	0.93	1.00
20	30	5	-4.04	1.72	0.66	1.72	2.18	3.51	-9.04	1.16	1.16	1.00	0.86	1.00
20	30	15	-4.08	1.74	0.67	1.87	2.27	3.68	-4.38	1.08	1.08	1.00	0.88	1.00
20	30	30	-4.09	1.75	0.67	1.93	2.32	3.76	-2.33	1.07	1.07	1.00	0.92	1.00
40	10	5	-4.08	1.73	0.66	1.83	2.21	3.66	-5.01	1.21	1.23	0.99	0.90	1.00
40	10	15	-4.07	1.75	0.67	1.89	2.35	3.72	-3.58	1.11	1.11	1.00	0.92	1.00
40	10	30	-4.09	1.75	0.67	1.94	2.39	3.77	-2.08	1.08	1.08	1.00	0.93	1.00
40	30	5	-4.02	1.72	0.66	1.69	2.18	3.46	-10.17	1.11	1.11	1.00	0.78	1.00
40	30	15	-4.09	1.75	0.67	1.88	2.29	3.70	-3.93	1.06	1.06	1.00	0.88	1.00
40	30	30	-4.08	1.75	0.67	1.92	2.36	3.76	-2.51	1.05	1.05	1.00	0.89	1.00

Note:

[1] Number of Hospital

[2] Number of Doctors

[3] Number of patients

[4] Ratio = $\dfrac{\widehat{SE}_{MOR}}{Simulation\ \widehat{SE}_{MOR}}$

[5] Confidence Interval Coverage Probability

[6] Model Convergence (Ratio of 1000 runs to the runs required to get 1000 converged cases)

[*] The mean prevalence for this simulation is 12%

[†] True MOR_1 is 3.85

[‡] True $\sigma^2_{u_{jk}}$ is 2

[§] True $\sigma^2_{v_k}$ is 2.5

[¶] True Values of $\beta_0 = -4.1$, $\beta_1 = 1.75$, $\beta_2 = 0.67$

Simulation Result Table for MOR of Third Level

L[1]	M[2]	N[3]	$\widehat{\beta_0}$	$\widehat{\beta_1}$	$\widehat{\beta_2}$	$\widehat{\sigma^2_{u_{jk}}}$	$\widehat{\sigma^2_{v_k}}$	$\widehat{MOR_2}$	Rel. Bias (%)	$\widehat{SE}_{MOR}$	Sim. $\widehat{SE}_{MOR}$	Ratio[4]	Coverage[5] (95%)	Model Conv[6]
20	10	5	-4.12	1.75	0.69	1.96	2.18	7.19	-5.00	1.39	1.42	0.98	0.89	0.98
20	10	15	-4.09	1.74	0.67	1.87	2.24	7.04	-6.97	1.26	1.28	0.98	0.86	1.00
20	10	30	-4.08	1.75	0.67	1.94	2.32	7.26	-3.97	1.24	1.25	0.99	0.89	1.00
20	30	5	-4.04	1.72	0.66	1.72	2.18	6.68	-11.66	1.25	1.28	0.98	0.80	1.00
20	30	15	-4.08	1.74	0.67	1.87	2.27	7.04	-6.95	1.21	1.22	0.99	0.85	1.00
20	30	30	-4.09	1.75	0.67	1.93	2.32	7.21	-4.65	1.20	1.21	1.00	0.87	1.00
40	10	5	-4.08	1.73	0.66	1.83	2.21	6.91	-8.66	1.25	1.26	0.99	0.87	1.00
40	10	15	-4.07	1.75	0.67	1.89	2.35	7.19	-4.95	1.18	1.21	0.98	0.86	1.00
40	10	30	-4.09	1.75	0.67	1.94	2.39	7.32	-3.26	1.17	1.18	0.99	0.89	1.00
40	30	5	-4.02	1.72	0.66	1.69	2.18	6.57	-13.10	1.17	1.19	0.99	0.75	1.00
40	30	15	-4.09	1.75	0.67	1.88	2.29	7.05	-6.75	1.15	1.16	0.99	0.84	1.00
40	30	30	-4.08	1.75	0.67	1.92	2.36	7.24	-4.27	1.14	1.14	1.00	0.89	1.00

Note:

[1] Number of Hospital

[2] Number of Doctors

[3] Number of patients

[4] Ratio = $\dfrac{\widehat{SE}_{MOR}}{Simulation\ \widehat{SE}_{MOR}}$

[5] Confidence Interval Coverage Probability

[6] Model Convergence (Ratio of 1000 runs to the runs required to get 1000 converged cases)

[*] The mean prevalence for this simulation is 12%

[†] True MOR_2 is 7.56

[‡] True $\sigma^2_{u_{jk}}$ is 2

[§] True $\sigma^2_{v_k}$ is 2.5

[¶] True Values of $\beta_0 = -4.1$, $\beta_1 = 1.75$, $\beta_2 = 0.67$

Simulation Result Table All Together

								MOR_1						MOR_2						
L[1]	M[2]	N[3]	$\widehat{\beta_0}$	$\widehat{\beta_1}$	$\widehat{\beta_2}$	$\widehat{\sigma^2_{u_{jk}}}$	$\widehat{\sigma^2_{v_k}}$	$\widehat{MOR}$	Rel. Bias (%)	$\widehat{SE}_{MOR}$	Sim. $\widehat{SE}_{MOR}$	Ratio[4]	Coverage[5] (95%)	$\widehat{MOR}$	Rel. Bias (%)	$\widehat{SE}_{MOR}$	Sim. $\widehat{SE}_{MOR}$	Ratio[4]	Coverage[5] (95%)	Model Conv[6]
20	10	5	-4.12	1.75	0.69	1.96	2.18	3.85	-0.18	1.34	1.35	0.99	0.94	7.19	-5.00	1.39	1.42	0.98	0.89	0.98
20	10	15	-4.09	1.74	0.67	1.87	2.24	3.70	-3.99	1.15	1.16	0.99	0.91	7.04	-6.97	1.26	1.28	0.98	0.86	1.00
20	10	30	-4.08	1.75	0.67	1.94	2.32	3.79	-1.77	1.12	1.12	1.00	0.93	7.26	-3.97	1.24	1.25	0.99	0.89	1.00
20	30	5	-4.04	1.72	0.66	1.72	2.18	3.51	-9.04	1.16	1.16	1.00	0.86	6.68	-11.66	1.25	1.28	0.98	0.80	1.00
20	30	15	-4.08	1.74	0.67	1.87	2.27	3.68	-4.38	1.08	1.08	1.00	0.88	7.04	-6.95	1.21	1.22	0.99	0.85	1.00
20	30	30	-4.09	1.75	0.67	1.93	2.32	3.76	-2.33	1.07	1.07	1.00	0.92	7.21	-4.65	1.20	1.21	1.00	0.87	1.00
40	10	5	-4.08	1.73	0.66	1.83	2.21	3.66	-5.01	1.21	1.23	0.99	0.90	6.91	-8.66	1.25	1.26	0.99	0.87	1.00
40	10	15	-4.07	1.75	0.67	1.89	2.35	3.72	-3.58	1.11	1.11	1.00	0.92	7.19	-4.95	1.18	1.21	0.98	0.86	1.00
40	10	30	-4.09	1.75	0.67	1.94	2.39	3.77	-2.08	1.08	1.08	1.00	0.93	7.32	-3.26	1.17	1.18	0.99	0.89	1.00
40	30	5	-4.02	1.72	0.66	1.69	2.18	3.46	-10.17	1.11	1.11	1.00	0.78	6.57	-13.10	1.17	1.19	0.99	0.75	1.00
40	30	15	-4.09	1.75	0.67	1.88	2.29	3.70	-3.93	1.06	1.06	1.00	0.88	7.05	-6.75	1.15	1.16	0.99	0.84	1.00
40	30	30	-4.08	1.75	0.67	1.92	2.36	3.76	-2.51	1.05	1.05	1.00	0.89	7.24	-4.27	1.14	1.14	1.00	0.89	1.00

Note:

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[4] Ratio = $\dfrac{\widehat{SE}_{MOR}}{Simulation\ \widehat{SE}_{MOR}}$

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