Supplementary Information for "Bayesian Inference for High Dimensional Cox Models with Gaussian and Diffused-Gamma Priors: A Case Study of Mortality in COVID-19 Patients Admitted to the ICU"

Table S1: Over 100 repetitions with $n = 100$ and $p = 100$, comparisons of MAP estimates obtained by the GD prior approach with the estimates by the MCP, BLASSO, and DLASSO methods. All noise variables with true values of 0 are averaged and grouped as "Noise."

	COEF	**TRUE**	**MCP**		**BLASSO**		**GD**	
			MEAN(SE)	**MSE**	**MEAN(SE)**	**MSE**	**MEAN(SE)**	**MSE**
Scenario 1	β_1	1	1.06(0.21)	0.05	1.02(0.21)	0.04	0.99(0.16)	0.03
	β_2	1	1.06(0.19)	0.04	1.02(0.2)	0.04	0.99(0.16)	0.03
	β_5	1	1.04(0.2)	0.04	1(0.21)	0.04	0.97(0.17)	0.03
	β_6	1	1.06(0.22)	0.05	1.02(0.22)	0.05	1(0.18)	0.03
	Noise	0	0(0)	0.00	0(0)	0.00	0(0)	0.00
Scenario 2	β_1	1	0.85(0.62)	0.41	0.61(0.21)	0.20	0.92(0.25)	0.07
	β_2	1	0.94(0.57)	0.33	0.7(0.21)	0.13	0.98(0.24)	0.06
	β_3	1	0.84(0.65)	0.44	0.67(0.23)	0.16	0.93(0.26)	0.07
	β_4	1	1(0.57)	0.32	0.69(0.21)	0.14	0.99(0.25)	0.06
	β_5	1	0.77(0.56)	0.37	0.6(0.22)	0.20	0.91(0.24)	0.07
	β_{11}	1	0.83(0.56)	0.34	0.61(0.2)	0.19	0.95(0.23)	0.05
	β_{12}	1	0.91(0.6)	0.36	0.66(0.24)	0.17	0.93(0.3)	0.09
	β_{13}	1	0.86(0.59)	0.36	0.68(0.22)	0.15	0.95(0.23)	0.05
	β_{14}	1	0.94(0.6)	0.36	0.67(0.24)	0.17	0.96(0.27)	0.07
	β_{15}	1	0.82(0.55)	0.33	0.61(0.19)	0.19	0.93(0.21)	0.05
	Noise	0	0(0)	0.00	0(0)	0.00	0(0)	0.00
Scenario 3	β_1	1	0.62(0.52)	0.41	0.74(0.32)	0.17	1(0.26)	0.07
	β_2	1	0.63(0.55)	0.44	0.71(0.32)	0.19	0.94(0.29)	0.08
	β_3	1	0.64(0.5)	0.38	0.73(0.29)	0.16	0.96(0.28)	0.08
	β_4	-2.121	-1.05(1.17)	2.51	-1.29(0.76)	1.27	-1.87(0.47)	0.28
	β_5	0.333	0.12(0.17)	0.07	0.18(0.13)	0.04	0.2(0.21)	0.06
	Noise	0	0(0.01)	0.00	0(0.01)	0.00	0(0.01)	0.00

Table S2: Over 100 repetitions with $n = 100$ and $p = 200$, comparisons of MAP estimates obtained by the GD prior approach with the estimates by the MCP, BLASSO, and DLASSO methods. All noise variables with true values of 0 are averaged and grouped as "Noise."

	COEF	**TRUE**	**MCP**		**BLASSO**		**GD**	
			MEAN(SE)	**MSE**	**MEAN(SE)**	**MSE**	**MEAN(SE)**	**MSE**
Scenario 1	β_1	1	1.02(0.18)	0.03	1.01(0.2)	0.04	0.99(0.14)	0.02
	β_2	1	1(0.2)	0.04	1(0.18)	0.03	1(0.16)	0.03
	β_5	1	1.01(0.2)	0.04	1.02(0.2)	0.04	1.01(0.16)	0.03
	β_6	1	1.01(0.2)	0.04	1(0.21)	0.04	1.01(0.16)	0.03
	Noise	0	0(0)	0.00	0(0)	0.00	0(0)	0.00
Scenario 2	β_1	1	0.49(0.54)	0.55	0.53(0.21)	0.26	0.9(0.21)	0.05
	β_2	1	0.71(0.57)	0.41	0.65(0.24)	0.18	0.93(0.23)	0.06
	β_3	1	0.56(0.57)	0.51	0.62(0.24)	0.20	0.92(0.23)	0.06
	β_4	1	0.68(0.59)	0.44	0.59(0.23)	0.22	0.91(0.24)	0.06
	β_5	1	0.48(0.52)	0.54	0.56(0.24)	0.25	0.9(0.3)	0.10
	β_{11}	1	0.52(0.58)	0.57	0.54(0.25)	0.27	0.92(0.23)	0.06
	β_{12}	1	0.66(0.59)	0.46	0.63(0.22)	0.19	0.92(0.25)	0.07
	β_{13}	1	0.63(0.61)	0.50	0.64(0.23)	0.18	0.94(0.25)	0.07
	β_{14}	1	0.63(0.59)	0.48	0.58(0.26)	0.24	0.91(0.27)	0.08
	β_{15}	1	0.53(0.51)	0.48	0.57(0.18)	0.22	0.92(0.19)	0.04
	Noise	0	0(0)	0.00	0(0)	0.00	0(0)	0.00
Scenario 3	β_1	1	0.38(0.48)	0.62	0.64(0.35)	0.26	1.03(0.25)	0.06
	β_2	1	0.3(0.45)	0.70	0.59(0.36)	0.30	0.95(0.34)	0.12
	β_3	1	0.36(0.47)	0.63	0.62(0.35)	0.26	0.95(0.34)	0.12
	β_4	-2.121	-0.39(0.92)	3.83	-1.16(0.9)	1.71	-1.87(0.57)	0.39
	β_5	0.333	0.07(0.13)	0.09	0.14(0.12)	0.05	0.25(0.25)	0.07
	Noise	0	0(0)	0.00	0(0)	0.00	0(0)	0.00

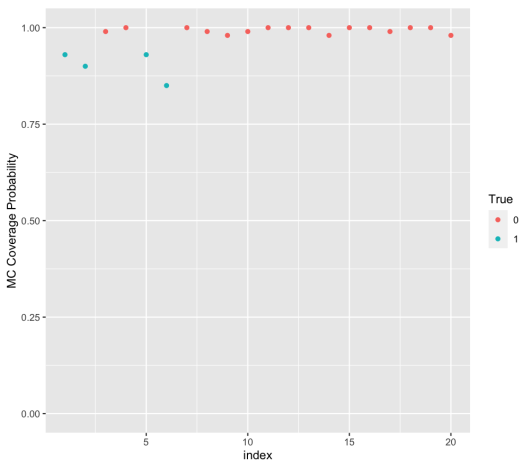

Fig. S1: MC coverage plot for Scenario 1 for $n = 100$ and $p = 20$. The legend "True" is 1 if the variable is nonzero and 0 if the variable is zero.

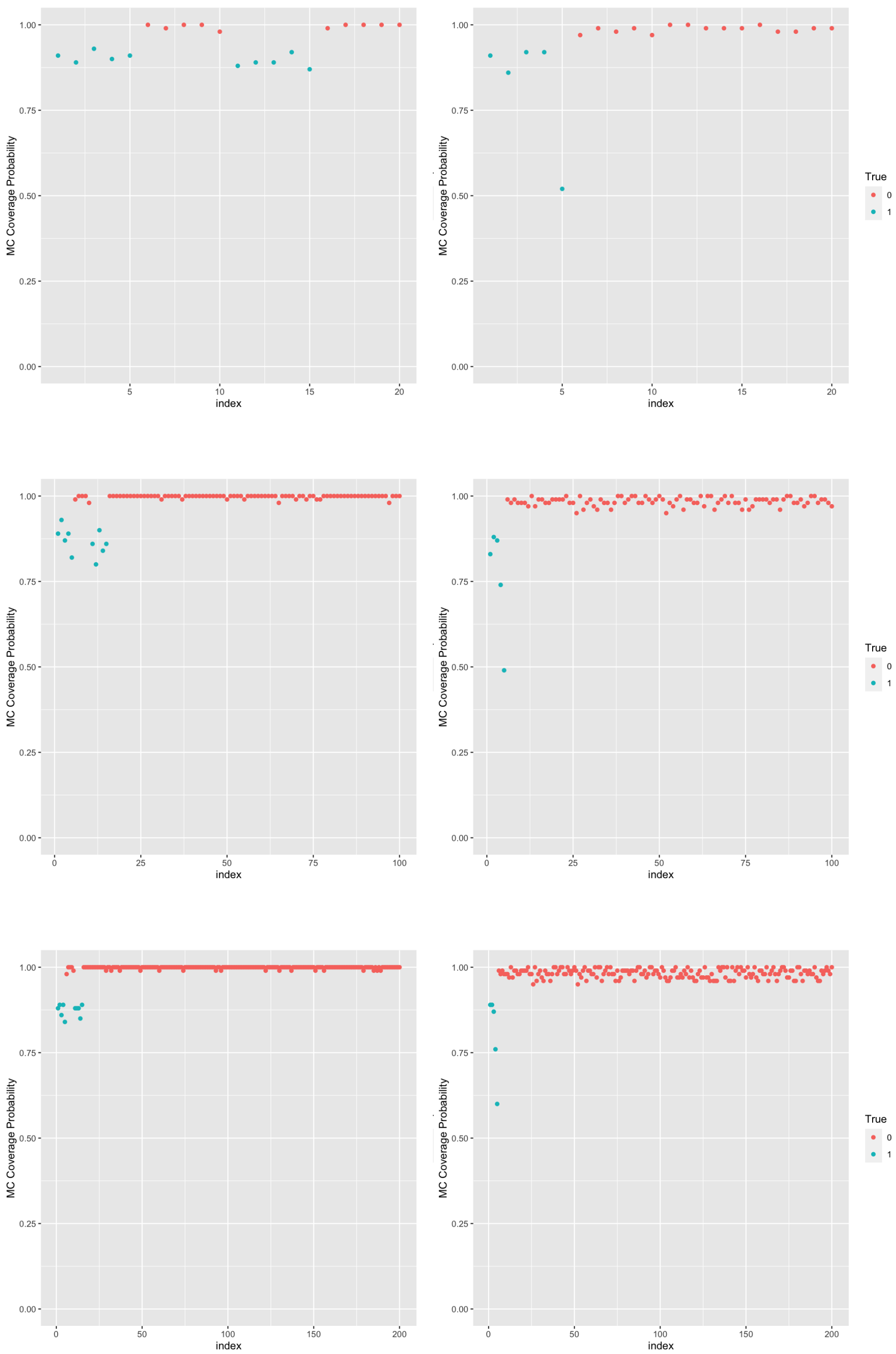

Fig. S2: MC coverage plot for Scenario 2 (left column) and Scenario 3 (right column) for $n = 100$ and $p = 20, 100, 200$. The legend True represents 1 if the variable is nonzero or 0 if the variable is zero.

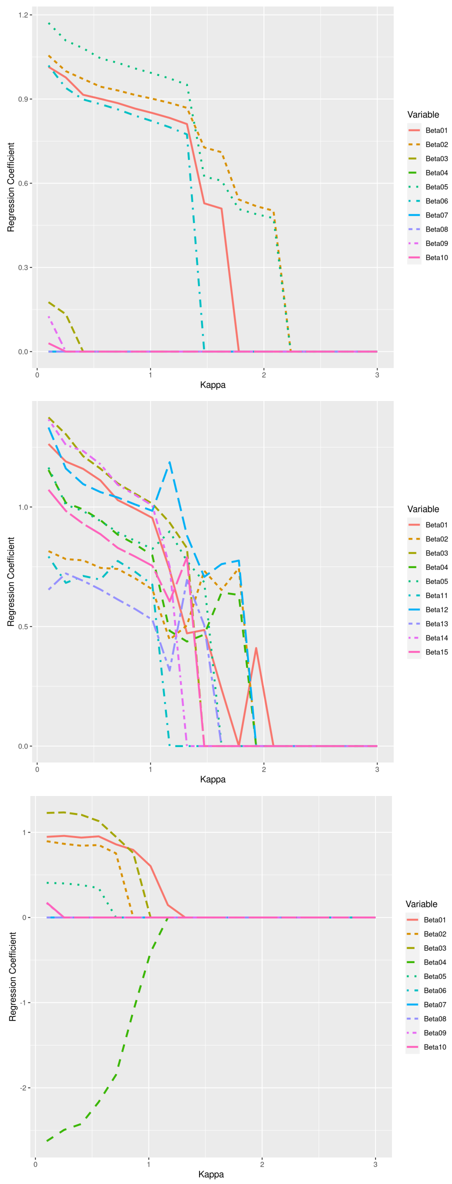

Fig. S3: Solution path for the tuning parameter in Scenarios 1 (top), 2 (middle), and 3 (bottom) for $n = 100$ and $p = 20$. The path for the first 10 regression coefficients in Scenarios 1 and 3, and the 10 regression coefficients with true values of 1 are displayed in Scenario 2.

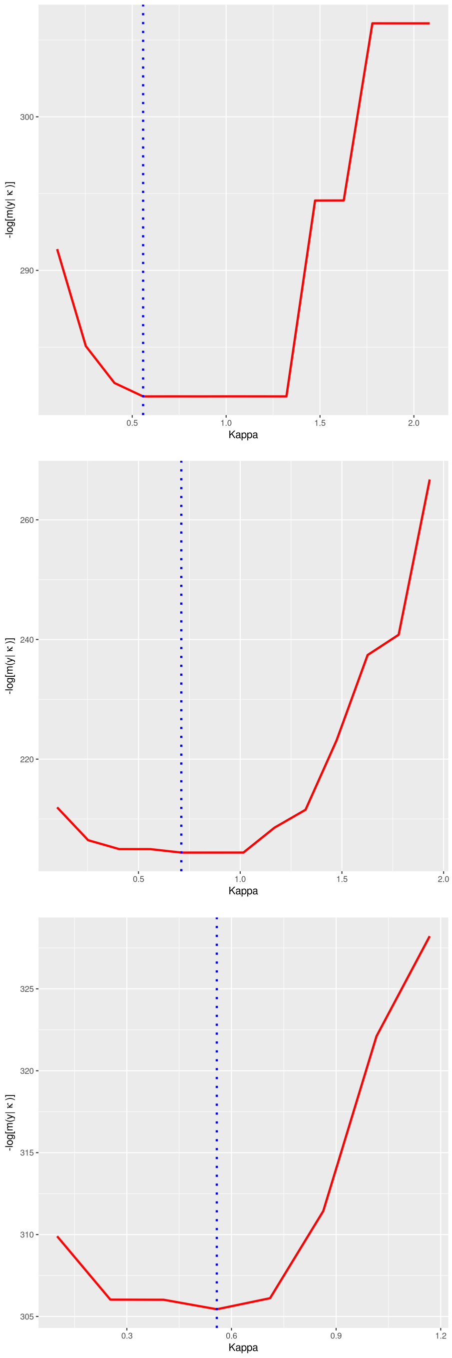

Fig. S4: Marginal likelihood estimates for selecting tuning parameter κ selection in Scenarios 1 (top), 2 (middle), and 3 (bottom), with $n = 100$ and $p = 20$. The chosen κ is indicated by the blue dotted vertical line corresponding to the maximum marginal likelihood.

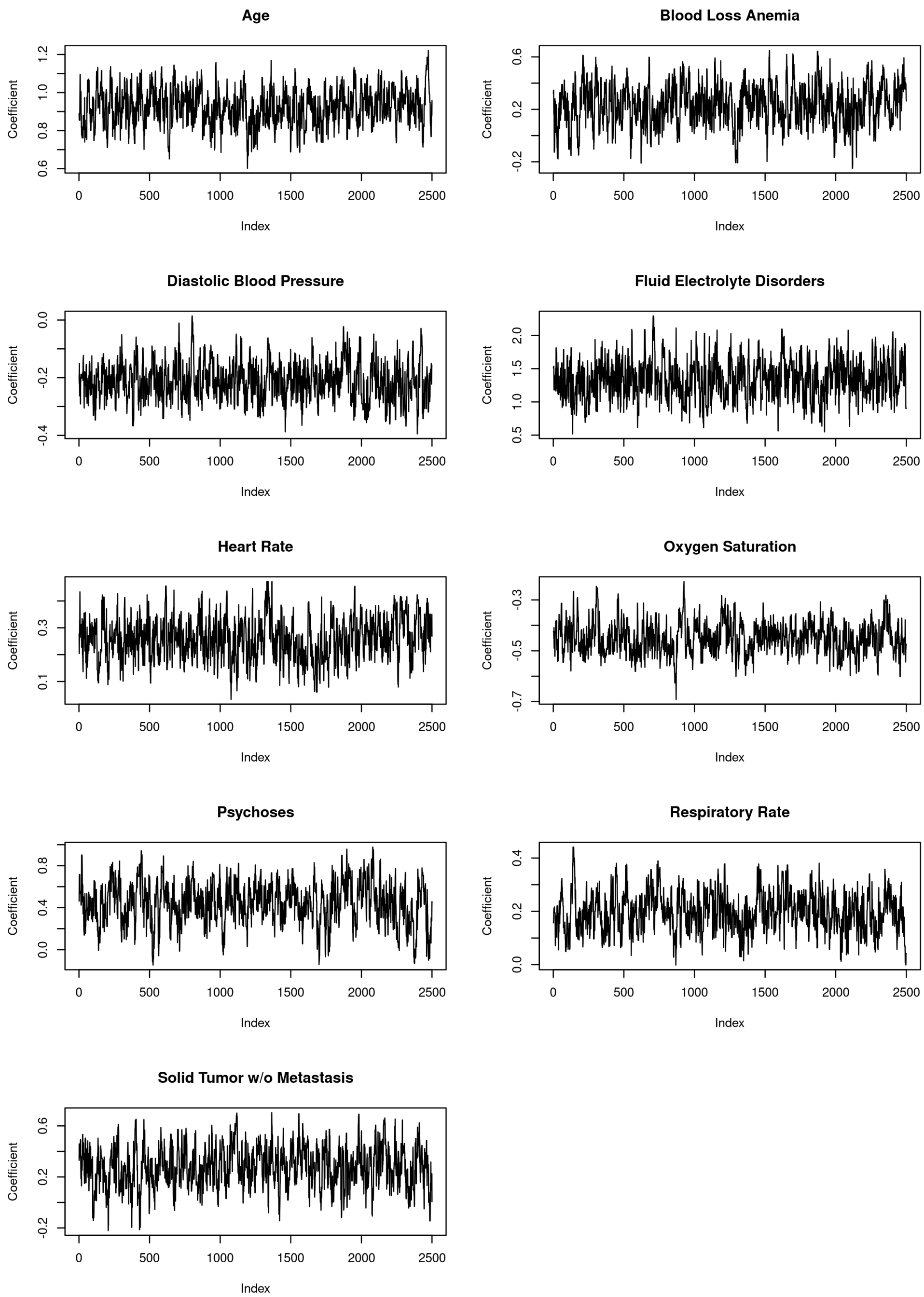

Fig. S5: MCMC trace plots for the selected variables in COVID-19 data.

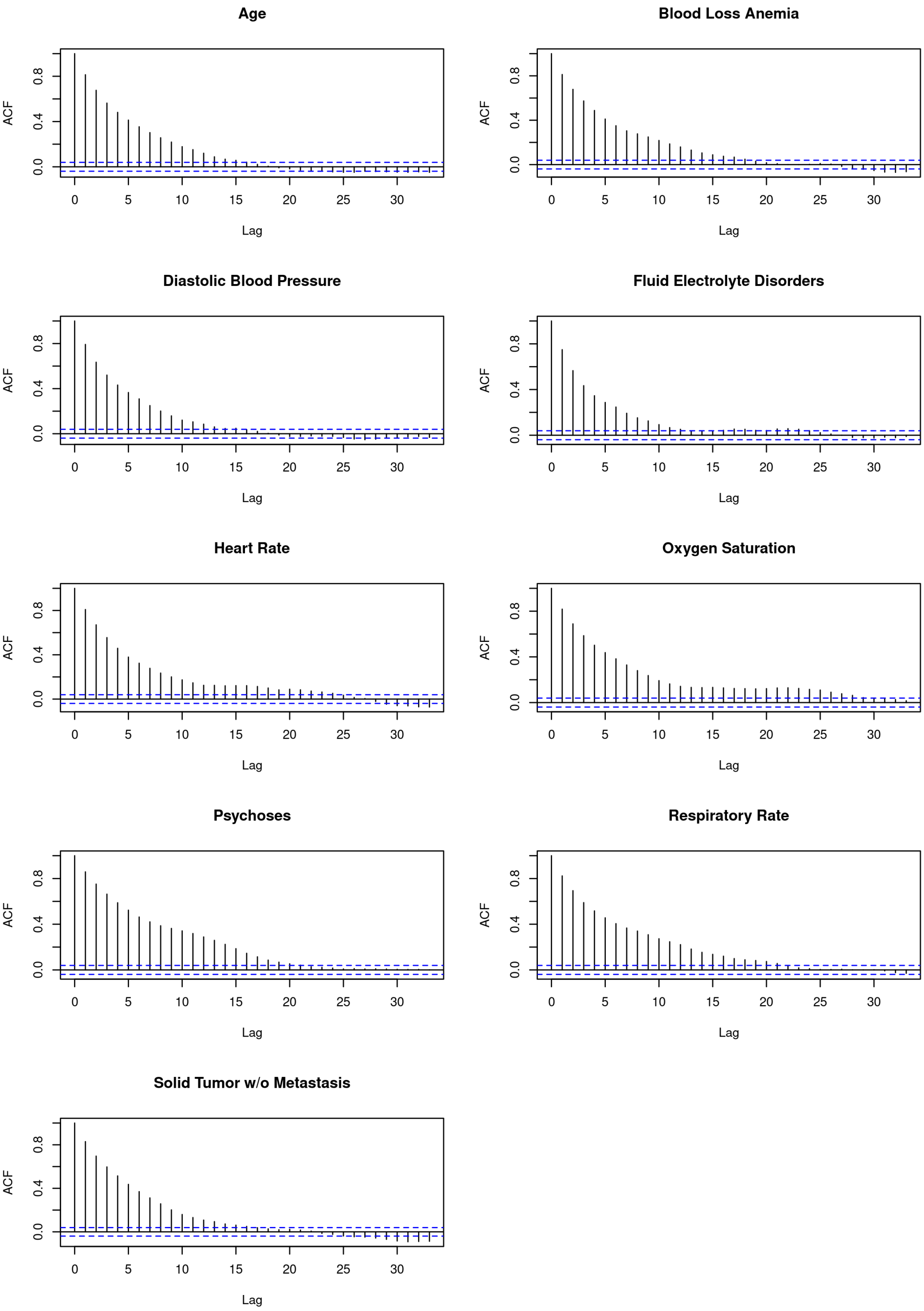

Fig. S6: MCMC autocorrelation plots of the selected variables in COVID-19 data.