

Appendix B

Table B.1: Model Performances (Full Model)

Classification Method	Dataset	Imputation Method	AUROC (95%CI)	Optimal Cutoff	Predicted Cases		Accurate Rate		Sensitivity	Specificity	Brier Score
					Death	Survival	Death	Survival			
Logistic Regression	A	Mean Value	0.78(0.76-0.80)	0.48	37199	69549	0.21	0.96	0.74	0.69	0.19
Logistic Regression	B	Mean Value	0.79(0.75-0.83)	0.46	34915	71833	0.24	0.97	0.80	0.72	0.17
Logistic Regression	C	Mean Value	0.83(0.83-0.83)	0.46	35970	70778	0.23	0.97	0.79	0.71	0.17
Logistic Regression	A	Random Forest	0.75(0.72-0.78)	0.49	39528	67220	0.18	0.95	0.69	0.66	0.21
Logistic Regression	B	Random Forest	0.82(0.82-0.82)	0.49	31996	74752	0.25	0.97	0.77	0.75	0.17
Logistic Regression	C	Random Forest	0.83(0.83-0.84)	0.46	36017	70731	0.23	0.97	0.79	0.71	0.17
Logistic Regression	A	Extra Trees Regression	0.74(0.72-0.76)	0.46	45762	60986	0.17	0.96	0.74	0.61	0.21
Logistic Regression	B	Extra Trees Regression	0.82(0.81-0.82)	0.47	33642	73106	0.25	0.97	0.79	0.74	0.17
Logistic Regression	C	Extra Trees Regression	0.83(0.83-0.84)	0.47	34579	72169	0.24	0.97	0.78	0.73	0.17
Logistic Regression	A	Ridge Regression	0.79(0.77-0.82)	0.46	38579	68169	0.21	0.97	0.78	0.68	0.18
Logistic Regression	B	Ridge Regression	0.80(0.78-0.83)	0.46	35034	71714	0.24	0.97	0.80	0.72	0.17

Logistic Regression	C	Ridge Regression	0.83(0.83-0.84)	0.47	35220	71528	0.23	0.97	0.78	0.72	0.17
Logistic Regression	A	Normal Value	0.76(0.73-0.79)	0.50	37392	69356	0.18	0.95	0.63	0.68	0.22
Logistic Regression	B	Normal Value	0.80(0.76-0.83)	0.50	30977	75771	0.26	0.97	0.76	0.76	0.17
Logistic Regression	C	Normal Value	0.83(0.83-0.83)	0.46	35676	71072	0.23	0.97	0.78	0.72	0.17
Logistic Regression	A	No Missing	0.73(0.72-0.74)	0.43	37658	69090	0.18	0.95	0.66	0.68	0.18
Logistic Regression	B	No Missing	0.8(0.80-0.81)	0.42	33153	73595	0.24	0.97	0.76	0.74	0.14
Logistic Regression	C	No Missing	0.82(0.82-0.82)	0.44	35333	71415	0.22	0.96	0.76	0.72	0.16
Logistic Regression	D	None	0.83(0.83-0.83)	0.47	34184	72564	0.24	0.97	0.78	0.73	0.17
Random Forest	A	Mean Value	0.84(0.84-0.84)	0.12	32330	74418	0.26	0.97	0.79	0.75	0.07
Random Forest	B	Mean Value	0.85(0.84-0.85)	0.11	32642	74106	0.26	0.97	0.80	0.75	0.07
Random Forest	C	Mean Value	0.85(0.85-0.85)	0.11	33548	73200	0.25	0.97	0.81	0.74	0.07
Random Forest	A	Random Forest	0.84(0.84-0.84)	0.12	32659	74089	0.25	0.97	0.78	0.75	0.07
Random Forest	B	Random Forest	0.84(0.84-0.85)	0.11	34093	72655	0.25	0.97	0.81	0.73	0.07

Random Forest	C	Random Forest	0.85(0.85-0.85)	0.11	33029	73719	0.25	0.97	0.80	0.74	0.07
Random Forest	A	Extra Trees Regression	0.84(0.84-0.84)	0.11	32938	73810	0.25	0.97	0.79	0.74	0.07
Random Forest	B	Extra Trees Regression	0.84(0.84-0.85)	0.12	32411	74337	0.26	0.97	0.80	0.75	0.07
Random Forest	C	Extra Trees Regression	0.85(0.85-0.85)	0.11	33567	73181	0.25	0.97	0.80	0.74	0.07
Random Forest	A	Ridge Regression	0.84(0.45-0.84)	0.11	34587	72161	0.24	0.97	0.80	0.73	0.07
Random Forest	B	Ridge Regression	0.84(0.84-0.85)	0.12	31643	75105	0.26	0.97	0.79	0.76	0.07
Random Forest	C	Ridge Regression	0.85(0.85-0.85)	0.12	32531	74217	0.25	0.97	0.79	0.75	0.07
Random Forest	A	Normal Value	0.84(0.84-0.84)	0.12	31234	75514	0.26	0.97	0.78	0.76	0.07
Random Forest	B	Normal Value	0.85(0.84-0.85)	0.11	32711	74037	0.26	0.97	0.80	0.75	0.07
Random Forest	C	Normal Value	0.85(0.85-0.85)	0.12	31159	75589	0.26	0.97	0.78	0.76	0.07
Random Forest	A	No Missing	0.77(0.77-0.78)	0.18	36332	70416	0.20	0.96	0.71	0.70	0.08
Random Forest	B	No Missing	0.83(0.82-0.83)	0.16	31836	74912	0.25	0.97	0.77	0.75	0.07
Random Forest	C	No Missing	0.84(0.83-0.84)	0.16	34517	72231	0.24	0.97	0.78	0.73	0.08

Random Forest	D	None	0.83(0.83-0.83)	0.11	33407	73341	0.24	0.97	0.77	0.74	0.07
Neural Network	A	Mean Value	0.83(0.83-0.84)	0.53	35031	71717	0.24	0.97	0.80	0.72	0.19
Neural Network	B	Mean Value	0.84(0.84-0.84)	0.52	32716	74032	0.25	0.97	0.79	0.75	0.17
Neural Network	C	Mean Value	0.84(0.84-0.84)	0.53	32549	74199	0.25	0.97	0.79	0.75	0.17
Neural Network	A	Random Forest	0.83(0.83-0.83)	0.55	32515	74233	0.25	0.97	0.77	0.75	0.19
Neural Network	B	Random Forest	0.84(0.84-0.84)	0.57	30842	75906	0.26	0.97	0.77	0.76	0.18
Neural Network	C	Random Forest	0.84(0.84-0.84)	0.55	34144	72604	0.24	0.97	0.79	0.73	0.18
Neural Network	A	Extra Trees Regression	0.83(0.83-0.83)	0.50	37351	69397	0.23	0.97	0.82	0.70	0.19
Neural Network	B	Extra Trees Regression	0.84(0.84-0.84)	0.54	33529	73219	0.25	0.97	0.80	0.74	0.18
Neural Network	C	Extra Trees Regression	0.84(0.84-0.84)	0.49	33324	73424	0.25	0.97	0.79	0.74	0.16
Neural Network	A	Ridge Regression	0.83(0.82-0.83)	0.51	33864	72884	0.24	0.97	0.78	0.73	0.17
Neural Network	B	Ridge Regression	0.84(0.83-0.84)	0.52	31186	75562	0.26	0.97	0.78	0.76	0.17
Neural Network	C	Ridge Regression	0.84(0.84-0.84)	0.55	32145	74603	0.25	0.97	0.78	0.75	0.18

Neural Network	A	Normal Value	0.83(0.83-0.84)	0.58	31675	75073	0.25	0.97	0.77	0.76	0.19
Neural Network	B	Normal Value	0.84(0.84-0.84)	0.45	35026	71722	0.24	0.97	0.81	0.72	0.16
Neural Network	C	Normal Value	0.84(0.84-0.84)	0.55	32864	73884	0.25	0.97	0.79	0.75	0.18
Neural Network	A	No Missing	0.66(0.64-0.68)	0.76	49011	57737	0.14	0.94	0.65	0.56	0.50
Neural Network	B	No Missing	0.79(0.78-0.79)	0.59	32676	74072	0.23	0.96	0.71	0.74	0.21
Neural Network	C	No Missing	0.79(0.78-0.79)	0.59	38619	68129	0.20	0.96	0.75	0.68	0.24
Neural Network	D	None	0.83(0.83-0.83)	0.52	33760	72988	0.24	0.97	0.78	0.73	0.18

Table B.2: Model Performance (Using only lab variables)

Classification Method	Dataset	Imputation Method	AUROC (95%CI)	Optimal Cutoff	Predicted Cases		Accurate Rate		Sensitivity	Specificity	Brier Score
					Death	Survival	Death	Survival			
Logistic Regression	A	Mean Value	0.63(0.62-0.63)	0.50	32327	74421	0.16	0.93	0.50	0.72	0.24
Logistic Regression	B	Mean Value	0.70(0.70-0.70)	0.47	33350	73398	0.21	0.95	0.66	0.73	0.20
Logistic Regression	C	Mean Value	0.74(0.74-0.74)	0.47	35248	71500	0.19	0.95	0.62	0.70	0.22
Logistic Regression	A	Random Forest	0.68(0.68-0.69)	0.48	39566	67182	0.17	0.94	0.63	0.66	0.23
Logistic Regression	B	Random Forest	0.71(0.71-0.71)	0.45	37758	68990	0.20	0.96	0.71	0.69	0.20
Logistic Regression	C	Random Forest	0.76(0.76-0.76)	0.47	38421	68327	0.18	0.95	0.66	0.67	0.21
Logistic Regression	A	Extra Trees Regression	0.69(0.69-0.70)	0.46	43607	63141	0.17	0.95	0.69	0.62	0.22
Logistic Regression	B	Extra Trees Regression	0.72(0.72-0.72)	0.44	39295	67453	0.20	0.96	0.73	0.67	0.19
Logistic Regression	C	Extra Trees Regression	0.76(0.76-0.76)	0.45	42675	64073	0.17	0.95	0.71	0.63	0.21
Logistic Regression	A	Ridge Regression	0.70(0.69-0.70)	0.47	42514	64234	0.17	0.95	0.69	0.63	0.22
Logistic Regression	B	Ridge Regression	0.72(0.72-0.72)	0.44	39856	66892	0.20	0.96	0.75	0.67	0.19

Logistic Regression	C	Ridge Regression	0.77(0.76-0.77)	0.45	42737	64011	0.17	0.95	0.71	0.63	0.21
Logistic Regression	A	Normal Value	0.60(0.59-0.60)	0.49	31990	74758	0.15	0.92	0.46	0.72	0.24
Logistic Regression	B	Normal Value	0.71(0.70-0.71)	0.45	38325	68423	0.19	0.95	0.70	0.68	0.20
Logistic Regression	C	Normal Value	0.74 (0.74-0.75)	0.46	41447	65301	0.17	0.95	0.68	0.64	0.22
Logistic Regression	A	No Missing	0.54 (0.49-0.59)	0.57	17678	89070	0.15	0.91	0.25	0.84	0.27
Logistic Regression	B	No Missing	0.68 n(0.68-0.68)	0.45	32766	73982	0.20	0.95	0.64	0.73	0.19
Logistic Regression	C	No Missing	0.73(0.73-0.73)	0.50	30965	75783	0.19	0.94	0.55	0.74	0.23
Logistic Regression	D	None	0.72(0.72-0.72)	0.49	35766	70982	0.19	0.95	0.64	0.70	0.21
Random Forest	A	Mean Value	0.71(0.71-0.71)	0.09	46226	60522	0.17	0.95	0.73	0.60	0.09
Random Forest	B	Mean Value	0.73(0.73-0.73)	0.10	44628	62120	0.18	0.96	0.75	0.62	0.09
Random Forest	C	Mean Value	0.73(0.73-0.74)	0.10	44525	62223	0.18	0.96	0.75	0.62	0.09
Random Forest	A	Random Forest	0.76(0.75-0.76)	0.09	41715	65033	0.18	0.96	0.74	0.65	0.08
Random Forest	B	Random Forest	0.77(0.77-0.77)	0.10	38154	68594	0.20	0.96	0.75	0.69	0.08

Random Forest	C	Random Forest	0.78(0.78-0.78)	0.09	40709	66039	0.19	0.96	0.75	0.66	0.08
Random Forest	A	Extra Trees Regression	0.77(0.77-0.77)	0.09	43230	63518	0.19	0.96	0.77	0.64	0.08
Random Forest	B	Extra Trees Regression	0.78(0.77-0.78)	0.10	38734	68014	0.20	0.96	0.76	0.68	0.08
Random Forest	C	Extra Trees Regression	0.78(0.78-0.79)	0.10	38810	67938	0.20	0.96	0.74	0.68	0.08
Random Forest	A	Ridge Regression	0.77(0.77-0.78)	0.10	39913	66835	0.20	0.96	0.75	0.67	0.08
Random Forest	B	Ridge Regression	0.78(0.78-0.78)	0.09	39663	67085	0.20	0.97	0.77	0.67	0.08
Random Forest	C	Ridge Regression	0.79(0.79-0.79)	0.09	40249	66499	0.20	0.96	0.76	0.66	0.08
Random Forest	A	Normal Value	0.71(0.71-0.71)	0.10	46047	60701	0.17	0.95	0.73	0.60	0.09
Random Forest	B	Normal Value	0.73(0.73-0.73)	0.10	44400	62348	0.18	0.96	0.75	0.62	0.09
Random Forest	C	Normal Value	0.73(0.73-0.74)	0.09	46774	59974	0.17	0.96	0.77	0.60	0.09
Random Forest	A	No Missing	0.66(0.64-0.67)	0.26	20159	86589	0.21	0.93	0.40	0.83	0.10
Random Forest	B	No Missing	0.72(0.71-0.73)	0.14	52201	54547	0.16	0.96	0.78	0.54	0.08
Random Forest	C	No Missing	0.74(0.73-0.74)	0.21	26193	80555	0.22	0.94	0.55	0.79	0.09

Random Forest	D	None	0.66(0.66-0.67)	0.45	33868	72880	0.18	0.94	0.57	0.71	0.18
Neural Network	A	Mean Value	0.71(0.70-0.73)	0.47	33169	73579	0.19	0.94	0.60	0.72	0.19
Neural Network	B	Mean Value	0.74(0.74-0.75)	0.49	31171	75577	0.21	0.95	0.63	0.75	0.19
Neural Network	C	Mean Value	0.75(0.75-0.76)	0.40	42096	64652	0.18	0.96	0.74	0.64	0.18
Neural Network	A	Random Forest	0.74(0.74-0.74)	0.50	37930	68818	0.19	0.95	0.68	0.68	0.19
Neural Network	B	Random Forest	0.75(0.73-0.76)	0.54	36554	70194	0.20	0.96	0.71	0.70	0.22
Neural Network	C	Random Forest	0.77(0.77-0.77)	0.42	42444	64304	0.18	0.96	0.74	0.64	0.18
Neural Network	A	Extra Trees Regression	0.75(0.75-0.76)	0.42	44585	62163	0.18	0.96	0.76	0.62	0.18
Neural Network	B	Extra Trees Regression	0.76(0.75-0.76)	0.46	40067	66681	0.20	0.96	0.75	0.67	0.19
Neural Network	C	Extra Trees Regression	0.77(0.77-0.77)	0.48	39088	67660	0.19	0.96	0.71	0.67	0.20
Neural Network	A	Ridge Regression	0.73(0.73-0.74)	0.49	43129	63619	0.18	0.96	0.74	0.63	0.21
Neural Network	B	Ridge Regression	0.75(0.74-0.76)	0.44	39388	67360	0.20	0.96	0.74	0.67	0.18
Neural Network	C	Ridge Regression	0.78(0.78-0.78)	0.53	38048	68700	0.19	0.95	0.68	0.68	0.21

Neural Network	A	Normal Value	0.72(0.71-0.72)	0.45	33193	73555	0.19	0.95	0.61	0.72	0.18
Neural Network	B	Normal Value	0.74(0.73-0.75)	0.50	37560	69188	0.20	0.96	0.71	0.69	0.20
Neural Network	C	Normal Value	0.76(0.76-0.76)	0.41	42187	64561	0.18	0.96	0.74	0.64	0.18
Neural Network	A	No Missing	0.47(0.45-0.49)	0.79	2628	104120	0.14	0.90	0.04	0.98	0.44
Neural Network	B	No Missing	0.70(0.68-0.72)	0.69	23720	83028	0.23	0.94	0.52	0.81	0.31
Neural Network	C	No Missing	0.73(0.72-0.73)	0.57	51077	55671	0.15	0.95	0.74	0.55	0.29
Neural Network	D	None	0.74(0.73-0.74)	0.50	36925	69823	0.19	0.95	0.67	0.69	0.21