

Handout #1 : Logistic Regression Risk Model for Isolated CABG Operative Mortality, 2024

Risk Factor		Frequency			Coefficient	Standard Error	p-value	Odds Ratio (OR)	95% Confidence Limits	
		N	Total	%					Lower Level	Upper Level
Intercept					-11.60	0.69	<.0001			
Age (Years)					0.05	0.01	<.0001	1.05	1.04	1.07
Gender	Male	202	10,270	2.0%						
	Female	86	2,679	3.2%	0.33	0.14	0.0196	1.39	1.06	1.84
Race	White	142	6,746	2.1%						
	Asian	36	2,211	1.6%	-0.23	0.20	0.2564	0.79	0.53	1.18
	Black	13	507	2.6%	-0.12	0.31	0.7064	0.89	0.48	1.64
	Hispanic	90	3,279	2.7%	0.15	0.15	0.3214	1.16	0.86	1.57
	Native American	2	54	3.7%	0.57	0.75	0.4476	1.76	0.41	7.62
	Pacific Islander	5	152	3.3%	0.35	0.49	0.4726	1.42	0.55	3.71
Body Mass Index	Normal 18.5 - < 30.0	170	8,354	2.0%						
	< 18.5	6	87	6.9%	0.99	0.46	0.0312	2.70	1.09	6.64
	30.0 - 40.0	95	4,077	2.3%	0.26	0.14	0.0615	1.30	0.99	1.71
	> 40.0	17	431	3.9%	0.77	0.29	0.0074	2.15	1.23	3.77
Status of Procedure	Elective	51	4,823	1.1%						
	Urgent	212	7,840	2.7%	0.55	0.18	0.0028	1.73	1.21	2.47
	Emergent	25	286	8.7%	1.08	0.36	0.0027	2.96	1.46	6.01
Hypertension	No	14	1,354	1.0%						
	Yes	274	11,595	2.4%	0.40	0.29	0.1730	1.49	0.84	2.65
Cerebrovascular Disease	No	201	10,573	1.9%						
	Yes	87	2,376	3.7%	0.24	0.14	0.0863	1.27	0.97	1.67
Pneumonia	No	264	12,546	2.1%						
	Yes	24	403	6.0%	0.22	0.24	0.3568	1.25	0.78	2.00
Chronic Lung Disease	None/Mild/Moderate	244	12,102	2.0%						
	Severe	44	847	5.2%	0.42	0.18	0.0208	1.53	1.07	2.19
Myocardial Infarction (MI)	No MI	141	8,542	1.7%						
	< 24 hours	16	238	6.7%	0.58	0.36	0.1069	1.79	0.88	3.64
	1 - 7 days ago	131	4,169	3.1%	0.38	0.14	0.0093	1.46	1.10	1.93
Heart Failure	No	123	8,983	1.4%						
	Yes	165	3,966	4.2%	0.24	0.15	0.1084	1.28	0.95	1.72
Ejection Fraction (EF)	EF >=50%	135	9,176	1.5%						
	EF less than 20%	9	94	9.6%	1.41	0.41	0.0006	4.11	1.82	9.24
	EF 20- <30%	35	590	5.9%	0.84	0.23	0.0004	2.31	1.46	3.66
	EF 30- <40%	48	1,217	3.9%	0.31	0.20	0.1196	1.37	0.92	2.03
	EF 40- <50%	61	1,872	3.3%	0.42	0.17	0.0152	1.53	1.09	2.15
Cardiogenic Shock	No	268	12,818	2.1%						
	Yes	20	131	15.3%	0.96	0.31	0.0016	2.62	1.44	4.76
Arrhythmia	No	188	11,106	1.7%						
	Yes	100	1,843	5.4%	0.71	0.14	<.0001	2.04	1.55	2.67
Mitral Insufficiency	None, Trivial, Mild	239	11,892	2.0%						
	Moderate/Severe	49	1,057	4.6%	0.09	0.18	0.6128	1.09	0.77	1.55
Left Main Disease	No	161	8,783	1.8%						
	Yes	127	4,166	3.0%	0.11	0.13	0.4159	1.11	0.86	1.44
Number of Diseased Coronary Vessels	None, One, or Two	55	3,039	1.8%						
	3 or more	233	9,910	2.4%	0.21	0.16	0.1963	1.23	0.90	1.69
Diabetes	No Diabetes	100	6,274	1.6%						
	Non-Insulin	101	4,422	2.3%	0.11	0.15	0.4654	1.12	0.83	1.51
	Insulin	87	2,253	3.9%	0.32	0.17	0.0620	1.38	0.98	1.93
Liver Disease	No	262	12,550	2.1%						
	Yes	26	399	6.5%	1.11	0.23	<.0001	3.03	1.91	4.80

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Risk Factor	Frequency			Coefficient	Standard Error	p-value	Odds Ratio (OR)	95% Confidence Limits	
	N	Total	%					Lower Level	Upper Level
Creatinine				1.42	0.15	<.0001	4.13	3.07	5.54
Peripheral Arterial Disease	No	226	11,744	1.9%					
	Yes	62	1,205	5.1%	0.48	0.16	0.0029	1.61	1.18
immunocompromise	No	272	12,555	2.2%					
	Yes	16	394	4.1%	0.39	0.28	0.1632	1.48	0.85
Prior Cardiac Surgery	First	284	12,858	2.2%					
	Second or more	4	91	4.4%	0.67	0.56	0.2318	1.95	0.65
Previous PCI	No PCI or > 6 hours	280	12,873	2.2%					
	<= 6 hours	8	76	10.5%	1.15	0.47	0.0145	3.15	1.26
Dual Payer Status	No	218	11,291	1.9%					
	Yes	70	1,658	4.2%	0.35	0.15	0.0186	1.43	1.06

Bolded text indicates statistically significant (p≤0.05).

C Statistic =0.836

Hosmer-Lemeshow test: p-value=0.217

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Handout #2 : Logistic Regression Risk Model for CABG+Valve Operative Mortality, 2023-2024

Risk Factor		Frequency			Coefficient	Standard Error	p-value	Odds Ratio (OR)	95% Confidence Limits	
		N	Total	%					Lower Level	Upper Level
Intercept					-7.80	0.82	<.0001			
Surgery Type	IsoAVRCAB	80	2,296	3.5%	Reference					
	IsoMVRRepairCAB	12	419	2.9%	-0.38	0.37	0.3032	0.68	0.33	1.41
	IsoMVR CAB	63	653	9.6%	0.75	0.24	0.0019	2.13	1.32	3.42
	IsoAVMVCAB	19	205	9.3%	0.87	0.31	0.0054	2.40	1.29	4.43
Age					0.03	0.01	0.0004	1.04	1.02	1.06
Gender	Male	110	2,775	4.0%						
	Female	64	798	8.0%	0.56	0.18	0.0020	1.75	1.23	2.49
Race	White	100	1,575	6.3%						
	Others	74	1,998	3.7%	0.47	0.17	0.0077	1.59	1.13	2.24
Body Mass Index	Normal 18.5 - < 30.0	106	2,356	4.5%						
	< 18.5	5	39	12.8%	0.35	0.53	0.5119	1.41	0.50	3.97
	30.0 - 40.0	51	1,040	4.9%	0.18	0.19	0.3415	1.20	0.83	1.74
	> 40.0	12	138	8.7%	0.87	0.36	0.0151	2.39	1.18	4.82
Status of Procedure	Elective	62	1,951	3.2%						
	Urgent	104	1,574	6.6%	0.21	0.20	0.2848	1.24	0.84	1.83
	Emergent	8	48	16.7%	0.76	0.56	0.1728	2.13	0.72	6.33
Hypertension	No	13	425	3.1%						
	Yes	161	3,148	5.1%	0.35	0.31	0.2671	1.42	0.77	2.62
Cerebrovascular Disease	No	114	2,749	4.1%						
	Yes	60	824	7.3%	0.34	0.18	0.0589	1.40	0.99	2.00
Pneumonia	No	160	3,427	4.7%						
	Yes	14	146	9.6%	0.18	0.33	0.5869	1.20	0.63	2.30
Chronic Lung Disease	None/Mild/Moderate	153	3,326	4.6%						
	Severe	21	247	8.5%	0.29	0.26	0.2734	1.34	0.80	2.24
Myocardial Infarction	No MI	127	3,039	4.2%						
	< 24 hours	3	22	13.6%	0.72	0.76	0.3405	2.06	0.47	9.15
	1 - 7 days ago	44	512	8.6%	0.42	0.22	0.0616	1.52	0.98	2.35
Heart Failure	No	52	1,759	3.0%						
	Yes	122	1,814	6.7%	0.09	0.20	0.6419	1.10	0.74	1.63
Ejection Fraction (EF)	EF >=50%	95	2,531	3.8%						
	EF less than 20%	6	23	26.1%	1.97	0.56	0.0004	7.19	2.41	21.42
	EF 20- <30%	19	175	10.9%	0.99	0.30	0.0011	2.70	1.49	4.90
	EF 30- <40%	29	382	7.6%	0.50	0.25	0.0460	1.64	1.01	2.68
	EF 40- <50%	25	462	5.4%	0.09	0.26	0.7221	1.10	0.66	1.81
Mitral Insufficiency	No	78	2181	3.6%						
	Yes	96	1392	6.9%	0.04	0.23	0.8705	1.038	0.666	1.616
Diabetes	No Diabetes/Non-Insulin	135	3,077	4.4%						
	Insulin	39	496	7.9%	0.20	0.21	0.3532	1.22	0.80	1.86
Bilirubin					0.51	0.15	0.0005	1.67	1.25	2.22
Dialysis	No	141	3,363	4.2%						
	Yes	33	210	15.7%	1.16	0.25	<.0001	3.18	1.96	5.16
Peripheral Arterial Disease	No	137	3,192	4.3%						
	Yes	37	381	9.7%	0.63	0.21	0.0032	1.88	1.23	2.85

Immunocompromise	No	165	3,421	4.8%						
	Yes	9	152	5.9%	0.10	0.37	0.7842	1.11	0.53	2.30
Prior Valve	No	158	3,450	4.6%						
	Yes	16	123	13.0%	1.06	0.31	0.0006	2.88	1.57	5.30
Previous PCI	No	172	3,563	4.8%						
	Yes	2	10	20.0%	1.09	0.91	0.2344	2.97	0.49	17.81

Bolded text indicates statistically significant ($p \leq 0.05$).

C Statistic =0.796

Hosmer-Lemeshow test: p-value=0.367

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Handout #3: Logistic Regression Risk Model for Post-operative Stroke after Isolated CABG Surgery, 2023-2024

Risk Factor		Frequency			Coefficient	Standard Error	P value	Odds Ratio (OR)	95% Confidence Limits	
		N	Total	%					Lower Level	Upper Level
Intercept					-5.88	0.30	<.0001			
Age (Years)	Age <55	46	3,408	1.3%	Reference					
	55 <= Age <65	86	7,280	1.2%	-0.15	0.19	0.4321	0.86	0.60	1.25
	65 <= Age <75	130	9,847	1.3%	-0.05	0.18	0.7875	0.95	0.67	1.36
	Age >=75	85	5,457	1.6%	0.07	0.20	0.7078	1.08	0.73	1.59
Gender	Male	253	20,520	1.2%						
	Female	94	5,472	1.7%	0.19	0.13	0.1384	1.21	0.94	1.55
Race	White	161	13,730	1.2%						
	Asian	67	4,468	1.5%	0.23	0.15	0.1299	1.26	0.93	1.71
	Black	29	1,008	2.9%	0.75	0.21	0.0004	2.11	1.40	3.18
	Hispanic	82	6,377	1.3%	-0.08	0.14	0.5823	0.92	0.70	1.22
	American Indian	1	113	0.9%	-0.44	1.01	0.6666	0.65	0.09	4.71
	Pacific Islander	7	296	2.4%	0.62	0.40	0.1186	1.86	0.85	4.03
Body Mass Index	Normal 18.5 - < 30.0	222	16,685	1.3%						
	< 18.5	6	172	3.5%	0.76	0.43	0.0774	2.13	0.92	4.95
	30.0 - 40.0	99	8,233	1.2%	-0.08	0.13	0.5223	0.92	0.72	1.18
	> 40.0	20	902	2.2%	0.47	0.24	0.0550	1.60	0.99	2.58
Status of Procedure	Elective	83	9,538	0.9%						
	Urgent	248	15,866	1.6%	0.35	0.15	0.0184	1.41	1.06	1.89
	Emergent	16	588	2.7%	0.29	0.37	0.4459	1.33	0.64	2.77
Hypertension	No	24	2,691	0.9%						
	Yes	323	23,301	1.4%	0.19	0.22	0.3808	1.21	0.79	1.86
Cerebrovascular Disease	No	223	21,124	1.1%						
	Yes	124	4,868	2.5%	0.78	0.12	<.0001	2.17	1.73	2.74
Pneumonia	No	324	25,198	1.3%						
	Yes	23	794	2.9%	0.35	0.23	0.1218	1.42	0.91	2.22
Myocardial Infarction (MI)	No MI	193	17,129	1.1%						
	< 24 hours	19	524	3.6%	0.99	0.31	0.0012	2.70	1.48	4.92
	1 - 7 days ago	135	8,339	1.6%	0.15	0.13	0.2346	1.17	0.91	1.50
Heart Failure	No	196	18,172	1.1%						
	Yes	151	7,820	1.9%	0.10	0.13	0.4399	1.11	0.85	1.44
Ejection Fraction (EF)	EF >=50%	195	18,334	1.1%						
	EF less than 20%	4	190	2.1%	0.36	0.53	0.4904	1.44	0.51	4.02
	EF 20- <30%	30	1,189	2.5%	0.50	0.22	0.0244	1.66	1.07	2.57
	EF 30- <40%	43	2,475	1.7%	0.13	0.19	0.4761	1.14	0.79	1.66
	EF 40- <50%	75	3,804	2.0%	0.38	0.15	0.0104	1.46	1.09	1.96
Cardiogenic Shock	No	337	25,713	1.3%						
	Yes	10	279	3.6%	0.30	0.36	0.3993	1.36	0.67	2.75
Arrhythmia	No	285	22,341	1.3%						
	Yes	62	3,651	1.7%	0.03	0.15	0.8597	1.03	0.77	1.37
Mitral Insufficiency	No	303	23,862	1.3%						
	Yes	44	2,130	2.1%	0.13	0.17	0.4659	1.13	0.81	1.59
Number of Diseased Coronary Vessels	None, One, or Two	59	5,944	1.0%						
	3 or more	288	20,048	1.4%	0.28	0.15	0.0518	1.33	1.00	1.77

Handout #3: Logistic Regression Risk Model for Post-operative Stroke after Isolated CABG Surgery, 2023-2024

Risk Factor		Frequency			Coefficient	Standard Error	P value	Odds Ratio (OR)	95% Confidence Limits	
		N	Total	%					Lower Level	Upper Level
Diabetes	No Diabetes	118	12,473	0.9%						
	Non-Insulin	145	8,943	1.6%	0.42	0.13	0.0013	1.52	1.18	1.96
	Insulin	84	4,576	1.8%	0.41	0.16	0.0095	1.50	1.10	2.04
MELD Score	<10	224	20,246	1.1%						
	>=10	123	5,746	2.1%	0.35	0.13	0.0071	1.42	1.10	1.84
Dialysis	No	312	24,450	1.3%						
	Yes	35	1,542	2.3%	0.01	0.21	0.9457	1.01	0.68	1.52
Peripheral Arterial Disease	No	302	23,521	1.3%						
	Yes	45	2,471	1.8%	0.01	0.17	0.9474	1.01	0.73	1.40
Previous PCI	No PCI or PCI > 6 hours	340	25,822	1.3%						
	< = 6 hours	7	170	4.1%	0.66	0.46	0.1547	1.93	0.78	4.77

Bolded text indicates statistically significant ($p \leq 0.05$).

C Statistic =0.708

Hosmer-Lemeshow test: p-value=0.485

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Handout #4 : Logistic Regression Risk Model for Hospital 30-Day Readmission, 2023–2024

Risk Factor		Frequency			Coefficient	Standard Error	p-value	Odds Ratio (OR)	95% Confidence Limits	
		N	Total	%					Lower Level	Upper Level
Intercept					-3.93	0.20	<.0001			
Age (Years)					0.01	0.00	<.0001	1.01	1.01	1.02
Gender	Male	1,648	16,609	9.9%						
	Female	657	4,383	15.0%	0.34	0.05	<.0001	1.40	1.27	1.56
Race	White	1,231	11,380	10.8%						
	Asian	372	3,544	10.5%	0.00	0.07	0.9445	1.00	0.87	1.14
	Black	120	875	13.7%	0.04	0.11	0.7133	1.04	0.84	1.28
	Hispanic	540	4,861	11.1%	-0.11	0.06	0.0509	0.89	0.80	1.00
	American Indian	11	100	11.0%	-0.06	0.33	0.8576	0.94	0.50	1.79
	Pacific Islander	31	232	13.4%	0.10	0.20	0.6144	1.11	0.74	1.65
Body Mass Index	Normal 18.5 - < 30.0	1,389	13,389	10.4%						
	< 18.5	19	130	14.6%	0.12	0.26	0.6411	1.13	0.68	1.87
	30.0 - 40.0	762	6,741	11.3%	0.11	0.05	0.0290	1.12	1.01	1.23
	> 40.0	135	732	18.4%	0.64	0.11	<.0001	1.89	1.54	2.33
Status of Procedure	Elective	687	7,969	8.6%						
	Urgent	1,556	12,606	12.3%	0.30	0.06	<.0001	1.35	1.21	1.51
	Emergent	62	417	14.9%	0.42	0.17	0.0147	1.52	1.09	2.12
Hypertension	No	177	2,151	8.2%						
	Yes	2,128	18,841	11.3%	0.04	0.09	0.6018	1.05	0.89	1.24
Cerebrovascular Disease	No	1,715	17,011	10.1%						
	Yes	590	3,981	14.8%	0.21	0.06	0.0002	1.23	1.10	1.38
Chronic Lung Disease	None/Mild/Moderate	2,074	19,665	10.5%						
	Severe	231	1,327	17.4%	0.32	0.08	<.0001	1.38	1.18	1.61
Myocardial Infarction (MI)	No MI	1451	14,055	10.3%						
	< 24 hours	50	361	13.9%	0.24	0.18	0.1881	1.27	0.89	1.80
	1 - 7 days ago	804	6,576	12.2%	0.05	0.05	0.4103	1.05	0.94	1.17
Heart Failure	No	1,363	14,905	9.1%						
	Yes	942	6,087	15.5%	0.23	0.06	<.0001	1.25	1.12	1.40
Ejection Fraction (EF)	EF >=50%	1,479	15,112	9.8%						
	EF less than 20%	23	128	18.0%	0.36	0.24	0.1448	1.43	0.89	2.30
	EF 20- <30%	119	888	13.4%	-0.03	0.11	0.8040	0.97	0.78	1.21
	EF 30- <40%	276	1,876	14.7%	0.12	0.08	0.1412	1.13	0.96	1.32
	EF 40- <50%	408	2,988	13.7%	0.15	0.07	0.0224	1.16	1.02	1.32
Cardiogenic Shock	No	2,274	20,836	10.9%						
	Yes	31	156	19.9%	0.24	0.22	0.2821	1.27	0.82	1.94
Atrial Fibrillation	No	1,923	18,747	10.3%						
	Yes	382	2,245	17.0%	0.33	0.07	<.0001	1.39	1.22	1.58
Mitral Insufficiency	None, Trivial, Mild	2,034	19,364	10.5%						
	Moderate/Severe	271	1,628	16.6%	0.18	0.08	0.0152	1.20	1.04	1.40
Infectious Endocarditis	No	2300	20,971	11.0%						
	Yes	5	21	23.8%	0.61	0.53	0.2444	1.84	0.66	5.17
Left Main Disease	No	1504	14,279	10.5%						
	Yes	801	6,713	11.9%	0.04	0.05	0.3583	1.05	0.95	1.15
Number of Diseased Coronary Vessels	None, One, or Two	513	4,821	10.6%						
	3 or more	1,792	16,171	11.1%	0.01	0.05	0.8465	1.01	0.91	1.13
Diabetes	No Diabetes	889	10,167	8.7%						
	Non-Insulin	809	7,112	11.4%	0.20	0.05	0.0002	1.22	1.10	1.35
	Insulin	607	3,713	16.3%	0.42	0.06	<.0001	1.52	1.34	1.72
MELD Score	<10	1,551	16,486	9.4%						
	>=10	754	4,506	16.7%	0.26	0.06	<.0001	1.29	1.16	1.45
Dialysis	No	2,017	19,801	10.2%						
	Yes	288	1,191	24.2%	0.59	0.09	<.0001	1.80	1.52	2.13

Handout #4 : Logistic Regression Risk Model for Hospital 30-Day Readmission, 2023–2024

Risk Factor		Frequency			Coefficient	Standard Error	p-value	Odds Ratio (OR)	95% Confidence Limits	
		N	Total	%					Lower Level	Upper Level
Peripheral Arterial Disease	No	1,956	18,977	10.3%						
	Yes	349	2,015	17.3%	0.32	0.07	<.0001	1.38	1.21	1.58
Immunocompromise	No	2,201	20,334	10.8%						
	Yes	104	658	15.8%	0.36	0.11	0.0017	1.43	1.14	1.78
Cancer Within 5 years	No	2,195	20,055	10.9%						
	Yes	110	937	11.7%	0.01	0.11	0.9540	1.01	0.81	1.24
Prior Carotid Surgery	No	2,245	20,602	10.9%						
	Yes	60	390	15.4%	0.02	0.15	0.9209	1.02	0.75	1.37
Dual Payer Status	No	1,923	18,266	10.5%						
	Yes	382	2,726	14.0%	0.09	0.06	0.1769	1.09	0.96	1.23

Bolded text indicates statistically significant ($p \leq 0.05$).

C Statistic =0.662

Hosmer-Lemeshow test: p-value=0.152

DRAFT