Supplementary Online Content

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eTable 1. Primary Procedure and Complication Codes

eTable 2. FTR Model 2

eTable 3. Full FTR Model 3

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eTable 1. Primary Procedure and Complication Codes

Complication	***ICD-9* Codes**
Respiratory Failure	518.81. 518.4, 518.5, 518.8 (except 518.83)
Pneumonia	481, 482.0-482.9, 483, 484, 485, 507.0
AMI	410.00-410.91
GI Bleeding	530.82, 531.00-531.21, 531.40, 531.41, 531.60, 531.61, 532.00-532.21532.40, 532.41, 532.60, 532.61, 533.00-533.21, 533.40, 533.41,533.60, 533.61, 534.00-534.21, 534.40, 534.41, 534.60, 534.61535.01, 535.11, 535.21, 535.31, 535.41, 535.51, 535.61, 578.9
DVT/PE	415.1, 451.11, 451.19, 451.2, 451.81, 453.8
Postoperative Hemorrhage	998.1
SSI	958.3, 998.3, 998.5, 998.59, 998.51
ARF	584
Postoperative Cardiac Event	997.1
Other postoperative infection, not wound or pneumonia	008.45, 320.00-320.99, 510.0, 510.9, 513.1, 519.2, 590.10-590.11, 590.80, 683
Hypotension/Shock/Hypovolemia	27.65, 27.650, 27.651, 27.652, 45.89, 78.550, 78.551, 78.552, 78.559, 79.63, 99.50, 99.54, 99.80
Procedure	***ICD-9* Codes**
Colectomy	45.72, 45.73, 45.74, 45.75, 45.76, 45.79, 45.81, 45.7, 45.8, 45.82, 45.83, 48.5
Open AAA repair	38.64, 38.34, 38.44, 38.36
Lung lobectomy	32.4, 32.41, 32.49, 32.30, 32.39, 32.3
Pneumonectomy	32.59, 32.50, 32.5
Esophagectomy	42.40, 42.41, 42.42
Hepatectomy	50.3, 50.22
Pancreatectomy	52.51, 52.52, 52.53, 52.59. 52.6, 52.7
Gastrectomy	43.5. 43.6, 43.7, 43.81, 43.91, 43.99. 43.8, 43.9

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eTable 2. FTR Model 2

	Parameter	Estimate	SE	Wald	OR Point Estimate	95% Wald CI (upper est., lower est.)		P Value
	Intercept	−3.9269	0.2019	378.2877				<.001
Patient Demographics	AGE	0.0398	0.00185	462.7009	1.041	1.037	1.044	<.001
	Black Race	0.0403	0.0707	0.3257	1.041	0.907	1.196	.57
	Other	−0.0852	0.0573	2.2114	0.918	0.821	1.027	.14
	Missing	−0.025	0.0671	0.1388	0.975	0.855	1.112	.71
	Female Sex	0.0141	0.0315	0.1993	1.014	0.356	0.423	.66
	Medicaid	0.0565	0.0819	0.4755	1.058	0.953	1.079	.49
	Private	−0.276	0.0475	33.793	0.759	0.901	1.242	<.001
	Self-pay	0.0523	0.1094	0.2288	1.054	0.691	0.833	.63
	No charge	−0.9149	0.3543	6.6697	0.401	0.85	1.306	.01
	Other	−0.0126	0.1283	0.0097	0.987	0.2	0.802	.92
Procedural Characteristics	Elective Operation	−0.9469	0.0442	459.8013	0.388	0.768	1.27	<.001
	open AAA Repair	0.1768	0.125	2.0005	1.193	0.934	1.525	.16
	Colorectal Resection	−0.262	0.1163	5.0744	0.769	0.613	0.967	.02
	Pneumonectomy	0.946	0.1806	27.4269	2.575	1.808	3.67	<.001
	Lung Lobectomy	0.0256	0.1283	0.0399	1.026	0.798	1.319	.84
	Esophagectomy	0.00549	0.1708	0.001	1.006	0.719	1.405	.97
	Gastrectomy	−0.0145	0.1311	0.0123	0.986	0.762	1.274	.91
	Pancreatectomy	0.1693	0.1193	2.0144	1.185	0.938	1.497	.16
Patient Comorbidity	CHF	0.188	0.0441	18.1597	1.207	1.107	1.316	<.001
	Valvular Disease	−0.5602	0.0898	38.9104	0.571	0.479	0.681	<.001
	Pulm Circ diseases	0.3778	0.086	19.2926	1.459	1.233	1.727	<.001
	PVD	0.3542	0.053	44.7515	1.425	1.285	1.581	<.001

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	HTN	−0.7133	0.0383	346.8847	0.49	0.455	0.528	<.001
	HTN w/complication	−0.5087	0.0718	50.2487	0.601	0.522	0.692	<.001
	Paralysis	0.5864	0.0996	34.6731	1.798	1.479	2.185	<.001
	Neurologic disorder	0.0358	0.078	0.2111	1.036	0.89	1.208	.65
	Chronic lung disease	−0.1096	0.0412	7.0904	0.896	0.827	0.971	.008
	DM	−0.171	0.05	11.6953	0.843	0.764	0.93	.001
	DM w/complication	−0.3672	0.1177	9.7352	0.693	0.55	0.872	.002
	Hypothyroidism	−0.4229	0.0727	33.8382	0.655	0.568	0.755	<.001
	CRF	0.2971	0.0646	21.1276	1.346	1.186	1.528	<.001
	Liver disease	0.6417	0.0883	52.8288	1.9	1.598	2.259	<.001
	Ulcer disease	−1.0666	0.4854	4.8296	0.344	0.133	0.891	.03
	AIDS	0.8155	0.3198	6.5039	2.26	1.208	4.23	.01
	Lymph	0.3866	0.1353	8.1591	1.472	1.129	1.919	.004
	Metastatic CA	−0.00603	0.0438	0.019	0.994	0.912	1.083	.89
	Tumor	0.1801	0.0805	5.0129	1.197	1.023	1.402	.03
	Arthritis	0.0174	0.1181	0.0217	1.018	0.807	1.283	.88
	Coagulopathy	1	0.0498	403.2273	2.718	2.465	2.997	<.001
	Obesity	−0.3766	0.0884	18.1263	0.686	0.577	0.816	<.001
	Weight loss	−0.0205	0.0431	0.2272	0.98	0.9	1.066	.63
	Electrolyte disturbance	0.2583	0.0353	53.5529	1.295	1.208	1.387	<.001
	Blood loss	−0.862	0.0973	78.471	0.422	0.349	0.511	<.001
	Anemia	−0.6728	0.0516	170.0977	0.51	0.461	0.565	<.001
	Alcoholism	−0.2463	0.1043	5.573	0.782	0.637	0.959	.02
	Drug addiction	−0.6521	0.2524	6.6759	0.521	0.318	0.854	.01
	Psych disorder	−0.499	0.1288	15.0167	0.607	0.472	0.781	<.001
	Depression	−0.6149	0.0973	39.9208	0.541	0.447	0.654	<.001
Hospital Characteristics	Hosp Size >200 Beds	−0.0847	0.0492	2.9591	0.919	0.834	1.012	.09
	Moderate	0.144	0.0507	8.0758	1.155	1.0	1.27	.005

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	Safety Net Burden					46	6	
	High Safety Net Burden	0.3269	0.0624	27.4937	1.387	1.227	1.567	<.001
	COTH Member	−0.0864	0.0608	2.0163	0.917	0.814	1.033	.16
	Midwest Region	−0.2364	0.0803	8.6605	0.789	0.674	0.924	.003
	South Region	−0.0994	0.058	2.9404	0.905	0.808	1.014	.09
	Western Region	−0.1146	0.058	3.9007	0.892	0.796	0.999	.048
	Private, not for profit	0.00335	0.0871	0.0015	1.003	0.846	1.19	.97
	Private, for-profit	0.157	0.1072	2.1478	1.17	0.948	1.444	.14

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eTable3. Full FTR Model 3

	Parameter	Estimate	SE	Wald	OR Point Estimate	95% Wald CI (upper est., lower est.)		P value
	Intercept	−4.1102	0.2284	323.9607				<.001
Patient Demographics	AGE	0.0394	0.00186	447.2141	1.04	1.036	1.044	<.001
	Black Race	0.0373	0.0719	0.2689	1.038	0.901	1.195	.60
	Other	−0.0809	0.0592	1.8666	0.922	0.821	1.036	.17
	Missing	−0.0416	0.069	0.3623	0.959	0.838	1.098	.55
	Female Sex	0.0171	0.0323	0.2815	1.017	0.955	1.084	.60
	Medicaid	0.0368	0.0839	0.1929	1.038	0.88	1.223	.66
	Private	−0.2858	0.0488	34.2681	0.751	0.683	0.827	<.001
	Self-pay	0.0787	0.1111	0.5015	1.082	0.87	1.345	.48
	No charge	−1.1459	0.3767	9.2529	0.318	0.152	0.665	.002
	Other	0.0151	0.1356	0.0123	1.015	0.778	1.324	.91
Procedural Characteristics	Elective Operation	−0.9166	0.0447	419.8159	0.4	0.366	0.437	<.001
	Open AAA Repair	0.178	0.1256	2.0092	1.195	0.934	1.528	.16
	Colorectal Resection	−0.2798	0.1181	5.6106	0.756	0.6	0.953	.02
	Pneumonectomy	0.9607	0.1779	29.1616	2.614	1.844	3.704	<.001
	Lung Lobectomy	−0.0323	0.1288	0.0628	0.968	0.752	1.246	.80
	Esophagectomy	−0.0188	0.1729	0.0118	0.981	0.699	1.377	.91
	Gastrectomy	−0.0672	0.1341	0.2514	0.935	0.719	1.216	.62
	Pancreatectomy	0.1432	0.1167	1.5058	1.154	0.918	1.45	.22
Patient Comorbidity	CHF	0.1947	0.0449	18.7839	1.215	1.113	1.327	<.001
	Valvular Disease	−0.5362	0.0928	33.3759	0.585	0.488	0.702	<.001
	Pulm Circ diseases	0.3967	0.0886	20.0476	1.487	1.25	1.769	<.001
	PVD	0.3463	0.0546	40.205	1.414	1.2	1.57	<.001

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				1		7	4	
	HTN	−0.7173	0.0397	327.1395	0.488	0.452	0.528	<.001
	HTN w/complication	−0.5332	0.0729	53.4292	0.587	0.509	0.677	<.001
	Paralysis	0.5664	0.1016	31.0603	1.762	1.444	2.15	<.001
	Neurologic disorder	0.0159	0.0811	0.0384	1.016	0.867	1.191	.84
	Chronic lung disease	−0.117	0.0425	7.5817	0.89	0.819	0.967	.006
	DM	−0.1788	0.0516	12.0031	0.836	0.756	0.925	<.001
	DM w/complication	−0.4113	0.1223	11.3053	0.663	0.522	0.842	<.001
	Hypothyroidism	−0.4251	0.0763	31.0327	0.654	0.563	0.759	<.001
	CRF	0.3131	0.0653	22.9702	1.368	1.203	1.555	<.001
	Liver disease	0.6413	0.0883	52.7109	1.899	1.597	2.258	<.001
	Ulcer disease	−1.0325	0.4916	4.4109	0.356	0.136	0.933	.04
	AIDS	0.7392	0.3421	4.6694	2.094	1.071	4.095	.03
	Lymph	0.3745	0.1387	7.2856	1.454	1.108	1.909	.007
	Metastatic CA	−0.0219	0.0451	0.2366	0.978	0.896	1.069	.63
	Tumor	0.1631	0.0824	3.916	1.177	1.002	1.384	.048
	Arthritis	0.0428	0.1219	0.1231	1.044	0.822	1.325	.73
	Coagulopathy	0.9858	0.0515	366.0581	2.68	2.422	2.965	<.001
	Obesity	−0.3821	0.0876	19.0139	0.682	0.575	0.81	<.001
	Weight loss	−0.00157	0.0433	0.0013	0.998	0.917	1.087	.97
	Electrolyte disturbance	0.2679	0.036	55.5059	1.307	1.218	1.403	<.001
	Blood loss	−0.875	0.1009	75.1868	0.417	0.342	0.508	<.001
	Anemia	−0.676	0.053	162.9303	0.509	0.458	0.564	<.001
	Alcoholism	−0.2351	0.1073	4.7979	0.791	0.641	0.976	.03
	Drug addiction	−0.7069	0.2756	6.5811	0.493	0.287	0.846	.01
	Psych disorder	−0.4808	0.1327	13.1349	0.618	0.477	0.802	<.001
	Depression	−0.5671	0.0982	33.3509	0.567	0.468	0.688	<.001
Hospital Characteristics	Hosp Size >200 Beds	−0.029	0.0512	0.3225	0.971	0.879	1.074	.57

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	Moderate Safety Net Burden	0.1431	0.0507	7.962	1.154	1.045	1.274	.005
	High Safety Net Burden	0.2993	0.0646	21.4957	1.349	1.189	1.531	<.001
	COTH Member	0.0102	0.0837	0.0148	1.01	0.857	1.19	.90
	Midwest Region	−0.2216	0.0819	7.3128	0.801	0.682	0.941	.007
	South Region	−0.1077	0.0601	3.2068	0.898	0.798	1.01	.07
	Western Region	−0.109	0.0669	2.6547	0.897	0.786	1.022	.10
	Private, not for profit	−0.00651	0.0925	0.0049	0.994	0.829	1.191	.94
	Private, for-profit	0.1	0.1125	0.7897	1.105	0.886	1.378	.37
Clinical Resources	%RN among all nurses	0.1356	0.0457	8.81	1.145	1.047	1.253	.003
	Nurse:patient ratio	−0.0751	0.0499	2.2689	0.928	0.841	1.023	.13
	High Technology	0.0825	0.0986	0.7009	1.086	0.895	1.318	.40
	Advanced Internal Medicine	0.0535	0.1026	0.2718	1.055	0.863	1.29	.60
	Advanced Cardiology	0.00361	0.0542	0.0044	1.004	0.902	1.116	.95
	Fully Implemented EMR	0.0597	0.0512	1.3581	1.062	0.96	1.174	.24
	Intensivists Provide Care	0.0615	0.0501	1.5095	1.063	0.964	1.173	.22

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