AHRQ Quality Indicators

Inpatient Quality Indicators (IQI) Parameter Estimates, v2024

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Table of Contents

Index of Tables

Executive Summary

This document provides statistical parameters associated with Version 2024 Agency for Healthcare Research and Quality (AHRQ) Quality Indicators (QI) Inpatient Quality Indicators (IQI). The parameter estimates derived for the AHRQ QI are based on analysis of the 2019, 2020, and 2021 AHRQ Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID).[1]

HCUP is a family of healthcare databases and related software tools and products developed through a Federal- State-Industry partnership. HCUP includes the largest collection of longitudinal hospital care data in the United States, with all-payer, encounter-level information beginning in 1988. The SID contain all-payer, encounter-level information on inpatient discharges, including clinical and resource information typically found on a billing record, such as patient demographics, up to 30 *International Classification of Diseases, Tenth Revision, Clinical Modification/Procedural Classification System* (ICD-10-CM/PCS) diagnoses and procedures, length of stay (LOS), expected payer, admission and discharge dates and discharge disposition.

In 2021, the HCUP databases represented more than 97 percent of all annual discharges in the U.S.[2] The analytic dataset used to generate the risk adjustment regression models in this document consists of the same hospital discharge records that comprise the reference population for Version 2024 of the AHRQ QI software. This reference population file was limited to community hospitals and excludes rehabilitation and long-term acute care (LTAC) hospitals. Information on the type of hospital was obtained by the American Hospital Association (AHA) Annual Survey of Hospitals. AHA defines community hospitals as "all non-Federal, short-term, general, and other specialty hospitals, excluding hospital units of institutions." Included among community hospitals are specialty hospitals such as obstetrics-gynecology, ear-nose-throat, orthopedic, and pediatric institutions. Also included are public hospitals and academic medical centers.

There are indicators of the diagnoses being present on admission (POA) in the SID for 45 states in 2019, 46 states in 2020, and 45 states in 2021.[3] Discharges from these participating States are used to develop hospital-level indicators. Edit checks on POA were developed during an HCUP evaluation of POA coding in the 2011 SID at hospitals that were required to report POA to CMS (Centers for Medicare and Medicaid Services, http://www.hcup-us.ahrq.gov/reports/methods/2015-06.pdf). The edits identify

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[1] Healthcare Cost and Utilization Project (HCUP) 2019, 2020, and 2021 State Inpatient Databases (SID). Agency for Healthcare Research and Quality, Rockville, MD.

[2] Introduction to the HCUP State Inpatient Databases (SID). Healthcare Cost and Utilization Project (HCUP). June 2022. Agency for Healthcare Research and Quality, Rockville, MD. https://hcup-us.ahrq.gov/db/state/siddist/Introduction_to_SID.pdf.

[3] States with data from 2019 included in the reference population for the hospital-level indicators are AK, AR, AZ, CA, CO, DC, FL, GA, HI, IA, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NY, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, and WV. States with data from 2020 included in the reference population are the states with 2019 data plus WY. States with data from 2021 included in the reference population are AK, AR, AZ, CA, CO, DC, FL, GA, HI, IA, IL, IN, KS, KY, LA, MA MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NY, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, and WV.

general patterns of suspect reporting of POA. The edits do not evaluate whether a valid POA value (e.g., Y or N) is appropriate for the specific diagnosis. There are three hospital-level edit checks:

1. Indication that a hospital has POA reported as Y on all diagnoses on all discharges

2. Indication that a hospital has POA reported as missing on all non-Medicare discharges

3. Indication that a hospital reported POA as missing on all nonexempt diagnoses for 15 percent or more of discharges. The cut-point of 15 percent was determined by 2 times the standard deviation plus the mean of the percentage for hospitals that are required to report POA to CMS.

This document is devoted to listing covariates and coefficients for risk adjustment regression models. The regression coefficients are used to calculate risk-adjusted rates that account for differences in patient populations across hospitals. IQI 21, IQI 22, and IQI 33 are not risk-adjusted, and thus are not presented in this document.

Covariates that are considered as potential risk adjusters for the hospital-level IQI include sex and age, Major Diagnostic Categories (MDC), AHRQ Clinical Classification Software Refined (CCSR) for Diagnoses and Procedures, Risk of Mortality subclass categories, whether they were transferred from another facility, and other indicator-specific risk stratifiers. Descriptions of some variable categories are provided in the Appendix tables at the end of the document. Every covariate in every model is a binary indicator variable, coded using 0 or 1. The AHRQ QI software user does not need to manipulate or adjust these coefficients; rather this document is intended to make it transparent to the user how the risk adjusted QI rates are calculated.

In addition to the presentation of the covariates for the risk models, this document provides the weights used in the hospital-level composites (IQI 90 and IQI 91).

Additional information on the risk adjustment process and composite indicators may be found in Quality Indicator Empirical Methods, available on the AHRQ QI website. (https://qualityindicators.ahrq.gov/modules/Default.aspx)

Acknowledgments

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Parameter Estimates Tables

Table 1. Risk Adjustment Coefficients for IQI 08 - Esophageal Resection Mortality Rate

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
Age_LT60	Age<60	1	-0.4505830474	0.2446025419	-1.8421028819	0.0655
Age_60_64	60 <= Age <= 64	1	-0.1407127454	0.2519460392	-0.5585035026	0.5765
Age_70_74	70 <= Age <= 74	1	0.2497047873	0.1242253230	2.0100956971	0.0444
Age_75_79	75 <= Age <= 79	1	0.3839904740	0.1596616774	2.4050259279	0.0162
Age_80_84	80 <= Age <= 84	1	0.4771113043	0.2247423683	2.1229254987	0.0338
Age_85Plus	Age >= 85	1	-0.3161785217	1.2168775100	-0.2598277304	0.7950
MALE	Patient Sex Flag: 1=Male / 0=Female	1	-0.1586399437	0.1462065797	-1.0850397027	0.2779
Age_LT60_MALE	Age<=60 MALE	1	-0.3461573845	0.2769163102	-1.2500433226	0.2113
Age_60_64_MALE	60 <= Age <= 64 MALE	1	-0.1958012226	0.2780408677	-0.7042174205	0.4813
Age_85Plus_MALE	Age >= 85 MALE	1	1.3000859374	1.2892389688	1.0084134663	0.3133
d_DXCCSR_BLD006	Coagulation and hemorrhagic disorders	1	0.4034393210	0.1616829629	2.4952494297	0.0126
d_DXCCSR_CIR007	Essential hypertension	1	-0.3773084437	0.0987994924	-3.8189309949	0.0001
d_DXCCSR_CIR011	Coronary atherosclerosis and other heart disease	1	0.5185633757	0.1362649346	3.8055525971	0.0001
d_DXCCSR_CIR014	Pulmonary heart disease	1	0.4664194353	0.3059168904	1.5246606185	0.1273
d_DXCCSR_CIR017	Cardiac dysrhythmias	1	0.3976008313	0.1240859251	3.2042379570	0.0014
d_DXCCSR_CIR019	Heart failure	1	0.4094091431	0.1419980913	2.8832017341	0.0039
d_DXCCSR_CIR026	Peripheral and visceral vascular disease	1	0.3080713300	0.2024606268	1.5216357610	0.1281
d_DXCCSR_DIG004	Occlusion or stenosis of precerebral or cerebral arteries without infarction	1	-0.6076258079	0.1025232798	-5.9267105850	<.0001
d_DXCCSR_DIG006	Gastrointestinal and biliary perforation	1	1.0395694948	0.2835179214	3.6666800095	0.0002
d_DXCCSR_DIG010	Abdominal hernia	1	-0.3795383202	0.1566222447	-2.4232721280	0.0154
d_DXCCSR_DIG019	Other specified and unspecified liver disease	1	0.4738000072	0.1858308438	2.5496306081	0.0108
d_DXCCSR_DIG021	Gastrointestinal hemorrhage	1	0.8939337649	0.2906731476	3.0753916291	0.0021
d_DXCCSR_END008	Malnutrition	1	0.3907438249	0.1004459991	3.8900884893	0.0001
d_DXCCSR_END010	Disorders of lipid metabolism	1	-0.6684805624	0.1111182715	-6.0159373750	<.0001
d_DXCCSR_END011	Fluid and electrolyte disorders	1	0.3500563060	0.1286351080	2.7213123334	0.0065
d_DXCCSR_FAC009	Implant, device or graft related encounter	1	-0.9128089742	0.1558398028	-5.8573545264	<.0001
d_DXCCSR_FAC022	Acquired absence of limb or organ	1	-0.4493885533	0.1735573333	-2.5892801234	0.0096
d_DXCCSR_GEN002	Acute and unspecified renal failure	1	0.6220539920	0.2149050633	2.8945525174	0.0038
d_DXCCSR_GEN003	Chronic kidney disease	1	0.3477472571	0.1395580290	2.4917753543	0.0127
d_DXCCSR_GEN012	Hyperplasia of prostate	1	-0.7813868516	0.2009685655	-3.8881048373	0.0001
d_DXCCSR_INF002	Septicemia	1	0.3038279724	0.3970781217	0.7651591860	0.4442
d_DXCCSR_INF008	Viral infection	1	0.4688542556	0.3120454146	1.5025192923	0.1330

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_INJ037	Complication of other surgical or medical care, injury, initial encounter	1	0.6657748240	0.3142494448	2.1186189346	0.0341
d_DXCCSR_MUS006	Osteoarthritis	1	-0.7415310294	0.2364251524	-3.1364303751	0.0017
d_DXCCSR_NEO013	Gastrointestinal cancers - stomach	1	-0.3392458664	0.1070559918	-3.1688638888	0.0015
d_DXCCSR_RSP002	Pneumonia (except that caused by tuberculosis)	1	0.1095705888	0.3003669955	0.3647890430	0.7153
d_DXCCSR_RSP010	Aspiration pneumonitis	1	0.2767809927	0.4440782404	0.6232707831	0.5331
d_DXCCSR_RSP011	Pleurisy, pleural effusion and pulmonary collapse	1	0.2376044898	0.1607165395	1.4784072041	0.1393
d_DXCCSR_RSP012	Respiratory failure; insufficiency; arrest	1	0.0543200393	0.2480409318	0.2189962717	0.8267
d_DXCCSR_RSP013	Lung disease due to external agents	1	1.3926338851	0.3214939181	4.3317581040	<.0001
d_DXCCSR_RSP016	Other specified and unspecified lower respiratory disease	1	0.2783182071	0.2171465489	1.2817067942	0.1999
d_DXCCSR_SYM003	Shock	1	0.4143012371	0.3716333077	1.1148119088	0.2649
d_DXCCSR_SYM005	Dysphagia	1	-0.7214935464	0.1570074829	-4.5952812778	<.0001
d_IQ08_PRCCSR_CAR010	Ligation and embolization of vessels	1	0.8821337682	0.3179107646	2.7747842049	0.0055
d_IQ08_PRCCSR_CAR012	Vessel repair and replacement	1	0.7836468339	0.5395067168	1.4525247036	0.1464
d_IQ08_PRCCSR_GIS004	GI system endoscopy without biopsy (diagnostic)	1	-0.6888450531	0.1274531123	-5.4046938572	<.0001
d_IQ08_PRCCSR_GIS009	Colectomy	1	0.8720732049	0.3441851713	2.5337326465	0.0113
d_IQ08_PRCCSR_GIS027	Upper GI therapeutic procedures, NEC (endoscopic)	1	-1.147672500	0.4469048561	-2.5680466088	0.0102
d_IQ08_PRCCSR_HEP013	Hepatobiliary and pancreatic procedures, NEC	1	0.6789039186	0.3292648111	2.0618781470	0.0392
d_IQ08_PRCCSR_LYM002	Lymph node excision (therapeutic)	1	-0.1737310502	0.1184482741	-1.4667250455	0.1425
d_IQ08_PRCCSR_RES012	Release of lung and pleura	1	0.6626701000	0.2341221168	2.8304463885	0.0046
TRNSFER	TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	0.0037483914	0.3085994232	0.0121464627	0.9903
YEAR_2019	Discharge YEAR is 2019 or before 2019	1	-0.2976246531	0.1610879954	-1.8475905194	0.0647
Q1	Quarter 1, 2020	1	-0.1713075109	0.2023719372	-0.8464983495	0.3973
Q2	Quarter 2, 2020	1	-0.3566850095	0.2075625928	-1.7184455291	0.0857
Q3	Quarter 3, 2020	1	-0.1244978996	0.2044107570	-0.6090574754	0.5425
Q4	Quarter 4, 2020	1	-0.2567947705	0.2076795357	-1.2364953036	0.2163
Q5	Quarter 1, 2021	1	-0.3912494558	0.2270475838	-1.7232046657	0.0849
Q6	Quarter 2, 2021	1	-0.3748133909	0.2126445351	-1.7626288428	0.0780
Q7	Quarter 3, 2021	1	-0.2326150366	0.2130083429	-1.0920465996	0.2748
Intercept	Intercept	1	-2.198214802	0.2291163239	-9.5943177020	<.0001

c-statistic=0.742

C-statistics for hospital level indicators are based on the test data (a random sample of 2019-2021 HCUP reference population, not used for the LASSO feature selection).
C-statistics for area level indicators are based on the full reference population data (2021 HCUP reference population).

Table 2. Risk Adjustment Coefficients for IQI 09 - Pancreatic Resection Mortality Rate

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
Age_LT30	Age < 30	1	-1.270284226	0.2319673712	-5.4761332154	<.0001
Age_30_34	30 <= Age <= 34	1	-1.132138162	0.2680933618	-4.2229250096	<.0001
Age_35_39	35 <= Age <= 39	1	-0.7367709330	0.2050441141	-3.5932313215	0.0003
Age_40_44	40 <= Age <= 44	1	-1.031821102	0.2199127237	-4.6919572653	<.0001
Age_45_49	45 <= Age <= 49	1	-0.7141182547	0.1721285001	-4.1487508128	<.0001
Age_50_54	50 <= Age <= 54	1	-0.4161060744	0.1394164855	-2.9846260508	0.0028
Age_55_59	55 <= Age <= 59	1	-0.1510383437	0.1156562588	-1.3059245150	0.1916
Age_60_64	60 <= Age <= 64	1	-0.0953802702	0.1042542660	-0.9148812213	0.3603
Age_70_74	70 <= Age <= 74	1	0.1557538842	0.1343691882	1.1591488066	0.2464
Age_75_79	75 <= Age <= 79	1	0.3756149612	0.1006937012	3.7302726656	0.0002
Age_80_84	80 <= Age <= 84	1	0.5435369994	0.1267485543	4.2883092617	<.0001
Age_85Plus	Age >= 85	1	0.8544918831	0.1651642328	5.1735891516	<.0001
MALE	Patient Sex Flag: 1=Male / 0=Female	1	0.1942736553	0.0677059671	2.8693727232	0.0041
Age_70_74_MALE	70 <= Age <= 74 MALE	1	0.2304478606	0.1596328594	1.4436116819	0.1488
MDC_7	Diseases and disorders of the hepatobiliary system and pancreas	1	-0.1819991127	0.0892179374	-2.0399385823	0.0414
MDC_17	Myeloproliferative diseases and disorders, poorly differentiated neoplasms	1	0.0936592433	0.7252889004	0.1291337055	0.8973
d_DXCCSR_BLD006	Coagulation and hemorrhagic disorders	1	0.5717311164	0.0931538727	6.1374916581	<.0001
d_DXCCSR_BLD007	Occlusion or stenosis of precerebral or cerebral arteries without infarction	1	-0.9238680591	0.1955456000	-4.7245658267	<.0001
d_DXCCSR_CIR007	Essential hypertension	1	-0.3247953547	0.0731676915	-4.4390542855	<.0001
d_DXCCSR_CIR011	Coronary atherosclerosis and other heart disease	1	0.3113507000	0.0880684971	3.5353243229	0.0004
d_DXCCSR_CIR017	Cardiac dysrhythmias	1	0.2041586094	0.0941555304	2.1683124578	0.0301
d_DXCCSR_CIR018	Cardiac arrest and ventricular fibrillation	1	3.1560264004	0.2910506686	10.8435634785	<.0001
d_DXCCSR_CIR019	Heart failure	1	0.6643017006	0.0948464041	7.0039734937	<.0001
d_DXCCSR_DIG004	Esophageal disorders	1	-0.3247808130	0.0774477592	-4.1935469311	<.0001
d_DXCCSR_DIG020	Pancreatic disorders (excluding diabetes)	1	-0.2114423211	0.1177291172	-1.7960070215	0.0725
d_DXCCSR_END001	Thyroid disorders	1	-0.3164533165	0.1050062719	-3.0136610963	0.0026
d_DXCCSR_END005	Diabetes mellitus, Type 2	1	-0.1674969859	0.0731487039	-2.2898148165	0.0220
d_DXCCSR_END008	Malnutrition	1	0.0509412532	0.0777306460	0.6553561030	0.5122
d_DXCCSR_END010	Disorders of lipid metabolism	1	-0.4489289631	0.0695627391	-6.4535837574	<.0001
d_DXCCSR_END011	Fluid and electrolyte disorders	1	0.4749700118	0.0740671696	6.4126928872	<.0001
d_DXCCSR_FAC009	Implant, device or graft related encounter	1	-0.6014579949	0.0882260063	-6.8172415359	<.0001
d_DXCCSR_FAC022	Acquired absence of limb or organ	1	-0.5697546168	0.1075276825	-5.2986784751	<.0001
d_DXCCSR_GEN002	Acute and unspecified renal failure	1	0.4084324070	0.1097262008	3.7222869669	0.0002
d_DXCCSR_GEN003	Chronic kidney disease	1	0.2665390341	0.0872758113	3.0539851771	0.0023
d_DXCCSR_INF002	Septicemia	1	0.7267763516	0.1601370574	4.5384645079	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_INJ010	Internal organ injury, initial encounter	1	0.5774493584	0.1838842408	3.1402873666	0.0017
d_DXCCSR_INJ016	Injury to blood vessels, initial encounter	1	0.5144208940	0.1817789538	2.8299254848	0.0047
d_DXCCSR_MBD005	Anxiety and fear-related disorders	1	-0.2260099719	0.1142738835	-1.9777919940	0.0480
d_DXCCSR_MBD024	Tobacco-related disorders	1	-0.2471058204	0.1103727522	-2.2388299234	0.0252
d_DXCCSR_NEO051	Endocrine system cancers - pancreas	1	-0.3832833234	0.0970308632	-3.9501176311	<.0001
d_DXCCSR_NEO070	Secondary malignancies	1	-0.3623719636	0.0758339445	-4.7784928777	<.0001
d_DXCCSR_NEO073	Benign neoplasms	1	-0.3956182149	0.2544103721	-1.5550396455	0.1199
d_DXCCSR_NVS016	Sleep wake disorders	1	-0.2012258857	0.0974753702	-2.0643767276	0.0390
d_DXCCSR_NVS019	Nervous system pain and pain syndromes	1	-0.8985053850	0.1662544295	-5.4043996755	<.0001
d_DXCCSR_RSP009	Asthma	1	-0.7547631067	0.1895129446	-3.9826467166	<.0001
d_DXCCSR_RSP012	Respiratory failure; insufficiency; arrest	1	0.4671757864	0.1306107865	3.5768545537	0.0003
d_DXCCSR_SYM003	Shock	1	0.0855605340	0.1524642622	0.5611841934	0.5747
d_IQ09_PRCCSR_CAR010	Ligation and embolization of vessels	1	0.6257937388	0.1521544466	4.1128849842	<.0001
d_IQ09_PRCCSR_CAR012	Vessel repair and replacement	1	0.7985272489	0.1053566815	7.5792748741	<.0001
d_IQ09_PRCCSR_GIS009	Colectomy	1	0.2893622905	0.1003099055	2.8846831124	0.0039
d_IQ09_PRCCSR_GIS010	Gastrectomy	1	0.1171167538	0.0741595635	1.5792535491	0.1143
d_IQ09_PRCCSR_GIS011	Small bowel resection	1	0.1679592917	0.1029781670	1.6310184628	0.1029
d_IQ09_PRCCSR_GIS012	Duodenal resection	1	0.2963470294	0.0846244630	3.5019073568	0.0005
d_IQ09_PRCCSR_GIS024	Other peritoneal cavity procedures	1	0.8345207581	0.1722606462	4.8445235539	<.0001
d_IQ09_PRCCSR_GIS025	Other GI system device procedures	1	0.3348717149	0.1036938293	3.2294276076	0.0012
d_IQ09_PRCCSR_HEP004	Hepatobiliary resection and ablation	1	0.3335075761	0.0866804540	3.8475522548	0.0001
d_IQ09_PRCCSR_HEP006	Cholecystectomy	1	-0.2661448487	0.0729398057	-3.6488285931	0.0003
d_IQ09_PRCCSR_URN008	Nephrectomy and ureterectomy	1	-0.0364170004	0.4614420458	-0.0789199873	0.9371
TRNSFER	TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	0.5129900479	0.1317624305	3.8932952742	<.0001
YEAR_2019	Discharge YEAR is 2019 or before 2019	1	0.1207628836	0.1160163670	1.0409124744	0.2979
Q1	Quarter 1, 2020	1	0.0106863153	0.1537012133	0.0695265514	0.9446
Q2	Quarter 2, 2020	1	0.1101382660	0.1484231898	0.7420556460	0.4581
Q3	Quarter 3, 2020	1	0.1122723606	0.1377055478	0.8153074617	0.4149
Q4	Quarter 4, 2020	1	0.0448704150	0.1477470294	0.3036975782	0.7614
Q5	Quarter 1, 2021	1	0.0677996737	0.1489618154	0.4551480090	0.6490
Q6	Quarter 2, 2021	1	-0.0307921265	0.1459400581	-0.2109916013	0.8329
Q7	Quarter 3, 2021	1	0.1454525974	0.1398963328	1.0397170137	0.2985
IQ09s	IQ09 Absence of Pancreatic Cancer Diagnosis Stratum	1	0.1387493522	0.1081259560	1.2832196564	0.1994
IQ09s_MDC_17	Interaction between IQ09 Absence of Pancreatic Cancer Diagnosis Stratum and Myeloproliferative diseases and disorders, poorly differentiated neoplasms	1	-0.7884286389	0.7244499230	-1.0883135105	0.2765

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
IQ09s_d_DXCCSR_DIG020	Interaction between IQ09 Absence of Pancreatic Cancer Diagnosis Stratum and Pancreatic disorders (excluding diabetes)	1	-0.3190358792	0.1558714087	-2.0467889646	0.0407
IQ09s_d_DXCCSR_NEO073	Interaction between IQ09 Absence of Pancreatic Cancer Diagnosis Stratum and Benign neoplasms	1	-0.2648958792	0.2829394724	-0.9362280805	0.3492
IQ09s_d_IQ09_PRCCSR_URN008	Interaction between IQ09 Absence of Pancreatic Cancer Diagnosis Stratum and Nephrectomy and ureterectomy	1	0.7560448616	0.4890395024	1.5459791240	0.1221
Intercept	Intercept	1	-3.417230525	0.1767836001	-19.3300199888	<.0001

c-statistic=0.822

C-statistics for hospital level indicators are based on the test data (a random sample of 2019-2021 HCUP reference population, not used for the HGLR feature selection).
C-statistics for area level indicators are based on the full reference population data (2021 HCUP reference population).

Table 3. Risk Adjustment Coefficients for IQI 11 - Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
Age_LT60	Age<60	1	-0.4914099486	0.1035771264	-4.7443867755	<.0001
Age_60_64	60 <= Age <= 64	1	-0.2257922395	0.0922456629	-2.4477274323	0.0144
Age_70_74	70 <= Age <= 74	1	0.3165002672	0.0680514160	4.6508990653	<.0001
Age_75_79	75 <= Age <= 79	1	0.5306712562	0.0715737634	7.4143265786	<.0001
Age_80_84	80 <= Age <= 84	1	0.6211367010	0.0758701147	8.1868427868	<.0001
Age_85_89	85 <= Age <= 89	1	0.8704375191	0.0874370788	9.9550160044	<.0001
Age_90Plus	Age >= 90	1	0.9406739886	0.1211447460	7.7648764799	<.0001
MALE	Patient Sex Flag: 1=Male / 0=Female	1	-0.3044693378	0.0483162027	-6.3015990612	<.0001
d_DXCCSR_BLD006	Coagulation and hemorrhagic disorders	1	0.3302144186	0.0605347154	5.4549594622	<.0001
d_DXCCSR_CIR007	Essential hypertension	1	-0.4071935086	0.0556437116	-7.3178710884	<.0001
d_DXCCSR_CIR008	Hypertension with complications and secondary hypertension	1	-0.3674362357	0.1593732159	-2.3055080721	0.0211
d_DXCCSR_CIR018	Cardiac arrest and ventricular fibrillation	1	2.0793689559	0.1853737296	11.2171717153	<.0001
d_DXCCSR_CIR019	Heart failure	1	0.8035020200	0.1096860018	7.3254745962	<.0001
d_DXCCSR_CIR031	Hypotension	1	0.4290223424	0.0781735775	5.4880735424	<.0001
d_DXCCSR_DIG004	Esophageal disorders	1	-0.2993367211	0.0611109703	-4.8982485452	<.0001
d_DXCCSR_DIG025	Other specified and unspecified gastrointestinal disorders	1	0.5872143998	0.1484944193	3.9544543336	<.0001
d_DXCCSR_END008	Malnutrition	1	0.8515239584	0.1641119897	5.1886760978	<.0001
d_DXCCSR_END010	Occlusion or stenosis of precerebral or cerebral arteries without infarction	1	-0.5236864858	0.0885105125	-5.9166586118	<.0001
d_DXCCSR_END011	Fluid and electrolyte disorders	1	0.7905122060	0.1252399863	6.3119793392	<.0001
d_DXCCSR_END016	Other specified and unspecified nutritional and metabolic disorders	1	-0.4161563386	0.0838159890	-4.9651187523	<.0001
d_DXCCSR_FAC009	Implant, device or graft related encounter	1	-0.4941735692	0.1032311116	-4.7870604254	<.0001
d_DXCCSR_FAC022	Acquired absence of limb or organ	1	-0.3300645335	0.0770829995	-4.2819368143	<.0001
d_DXCCSR_GEN002	Acute and unspecified renal failure	1	0.6014118056	0.1372236830	4.3827114434	<.0001
d_DXCCSR_GEN003	Chronic kidney disease	1	0.8603236975	0.1392072505	6.1801644265	<.0001
d_DXCCSR_GEN012	Hyperplasia of prostate	1	-0.4592489821	0.0768498805	-5.9759231785	<.0001
d_DXCCSR_MBD024	Tobacco-related disorders	1	-0.2742280660	0.0501193517	-5.4715006584	<.0001
d_DXCCSR_NVS016	Sleep wake disorders	1	-0.2887927606	0.0789966792	-3.6557582347	0.0003
d_DXCCSR_NVS019	Nervous system pain and pain syndromes	1	-0.5486020545	0.0986246084	-5.5625270769	<.0001
d_DXCCSR_RSP012	Respiratory failure; insufficiency; arrest	1	0.6550345369	0.1480595486	4.4241289605	<.0001
d_DXCCSR_SYM003	Shock	1	1.6706528709	0.2508364543	6.6603272466	<.0001
d_DXCCSR_SYM017	Abnormal findings without diagnosis	1	-0.3881429910	0.0783844539	-4.9517853544	<.0001
d_IQ11_PRCCSR_CAR007	Embolectomy, endarterectomy, and related vessel procedures (non-endovascular; excluding carotid)	1	0.9124368519	0.1570836233	5.8086058412	<.0001
d_IQ11_PRCCSR_CAR008	Angioplasty and related vessel procedures (endovascular; excluding carotid)	1	0.6936349383	0.0939012376	7.3868561946	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_IQ11_PRCCSR_CAR010	Ligation and embolization of vessels	1	0.5428714005	0.0758819929	7.1541531801	<.0001
d_IQ11_PRCCSR_CAR012	Vessel repair and replacement	1	0.5198812047	0.1364166541	3.8109804722	0.0001
d_IQ11_PRCCSR_CAR014	Peripheral arterial bypass procedures	1	0.7256271274	0.1710372403	4.2425095612	<.0001
d_IQ11_PRCCSR_CAR029	Cardiovascular device procedures, NEC	1	0.3491943157	0.0877413439	3.9798149916	<.0001
d_IQ11_PRCCSR_GIS005	Exploration of peritoneal cavity	1	1.5174655308	0.1925966779	7.8789808190	<.0001
d_IQ11_PRCCSR_GIS024	Other peritoneal cavity procedures	1	1.2272699360	0.1998589184	6.1406813648	<.0001
d_IQ11_PRCCSR_MST030	Musculoskeletal procedures, NEC	1	1.2160641093	0.1644110631	7.3964858974	<.0001
TRNSFER	TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	0.8369179868	0.1440141298	5.8113602335	<.0001
COVIDDX_Q4	COVID, Quarter 4, 2020	1	0.7976957395	0.4014656810	1.9869587297	0.0469
COVIDDX_Q5	COVID, Quarter 1, 2021	1	-0.1989422426	0.4402583105	-0.4518761778	0.6514
COVIDDX_Q7	COVID, Quarter 3, 2021	1	0.4558344561	0.5841002572	0.7804044776	0.4352
COVIDDX_Q8	COVID, Quarter 4, 2021	1	1.1275912410	0.3904102626	2.8882213123	0.0039
YEAR_2019	Discharge YEAR is 2019 or before 2019	1	-0.2740996262	0.0733139144	-3.7387121999	0.0002
Q1	Quarter 1, 2020	1	-0.3867852741	0.0957975908	-4.0375261100	<.0001
Q2	Quarter 2, 2020	1	-0.2585491277	0.1100474582	-2.3494329791	0.0188
Q3	Quarter 3, 2020	1	-0.1324494972	0.0974816083	-1.3587126790	0.1742
Q4	Quarter 4, 2020	1	-0.2467700720	0.0941994929	-2.6196539328	0.0088
Q5	Quarter 1, 2021	1	-0.2710764264	0.0978903003	-2.7691857670	0.0056
Q6	Quarter 2, 2021	1	-0.2595496983	0.0982149697	-2.6426694315	0.0082
Q7	Quarter 3, 2021	1	-0.1281716309	0.0948216393	-1.3517128781	0.1765
IQ11s0	IQ11 Open Repair of Ruptured AAA Diagnosis Stratum	1	4.8356760544	0.1354187642	35.7090546782	<.0001
IQ11s0_TRNSFER	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	-1.140516715	0.1717076132	-6.6422023662	<.0001
IQ11s0_d_DXCCSR_CIR008	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Hypertension with complications and secondary hypertension	1	-0.0769470798	0.2322750735	-0.3312756664	0.7404
IQ11s0_d_DXCCSR_CIR019	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Heart failure	1	-0.8589994934	0.1873729302	-4.5844375309	<.0001
IQ11s0_d_DXCCSR_DIG025	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Other specified and unspecified gastrointestinal disorders	1	-0.3578123300	0.1723956156	-2.0755303356	0.0379
IQ11s0_d_DXCCSR_END008	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Malnutrition	1	-1.850369105	0.2299242330	-8.0477341636	<.0001
IQ11s0_d_DXCCSR_END010	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Disorders of lipid metabolism	1	0.2633647580	0.1263364967	2.0846292635	0.0371
IQ11s0_d_DXCCSR_END011	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Fluid and electrolyte disorders	1	-0.5514452444	0.1526941085	-3.6114375981	0.0003

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
IQ11s0_d_DXCCSR_FAC009	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Implant, device or graft related encounter	1	0.7304392394	0.1450922695	5.0343084572	<.0001
IQ11s0_d_DXCCSR_GEN002	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Acute and unspecified renal failure	1	-0.5653383451	0.1685929452	-3.3532740317	0.0008
IQ11s0_d_DXCCSR_GEN003	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Chronic kidney disease	1	-0.9389066130	0.2080783844	-4.5122736601	<.0001
IQ11s0_d_DXCCSR_RSP012	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Respiratory failure; insufficiency; arrest	1	-0.7424096061	0.1932622468	-3.8414621501	0.0001
IQ11s0_d_DXCCSR_SYM003	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Shock	1	-1.202590833	0.2706877993	-4.4427227099	<.0001
IQ11s0_d_IQ11_PRCCSR_CAR007	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Embolectomy, endarterectomy, and related vessel procedures (non-endovascular)	1	-0.9974020438	0.1913144059	-5.2134183996	<.0001
IQ11s0_d_IQ11_PRCCSR_CAR008	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Angioplasty and related vessel procedures (endovascular; excluding carotid)	1	-0.8940297045	0.2933432799	-3.0477251935	0.0023
IQ11s0_d_IQ11_PRCCSR_CAR012	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Vessel repair and replacement	1	-0.4013265089	0.1595476488	-2.5154022128	0.0119
IQ11s0_d_IQ11_PRCCSR_CAR014	Interaction between IQ11 Open Repair of Ruptured AAA Diagnosis Stratum and Peripheral arterial bypass procedures	1	-0.8156003288	0.2094879849	-3.8933036140	<.0001
IQ11s1	IQ11 Open Repair of Unruptured AAA Diagnosis Stratum	1	2.3629810206	0.1341267139	17.6175271307	<.0001
IQ11s1_TRNSFER	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	-0.4276271784	0.2010074680	-2.1274193570	0.0334
IQ11s1_d_DXCCSR_CIR008	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Hypertension with complications and secondary hypertension	1	-0.1077678957	0.2155560163	-0.4999530867	0.6171
IQ11s1_d_DXCCSR_CIR019	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Heart failure	1	-0.3197835647	0.1686070027	-1.8966208968	0.0579
IQ11s1_d_DXCCSR_DIG025	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Other specified and unspecified gastrointestinal disorders	1	-0.0192096423	0.1873917237	-0.1025106229	0.9184

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
IQ11s1_d_DXCCSR_END008	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Malnutrition	1	-0.5531753914	0.2101228692	-2.6326282018	0.0085
IQ11s1_d_DXCCSR_END010	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Disorders of lipid metabolism	1	-0.0520241695	0.1268222778	-0.4102131768	0.6816
IQ11s1_d_DXCCSR_END011	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Fluid and electrolyte disorders	1	-0.3647947325	0.1642471913	-2.2210104758	0.0264
IQ11s1_d_DXCCSR_FAC009	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Implant, device or graft related encounter	1	0.2125094403	0.1424710128	1.4915977371	0.1358
IQ11s1_d_DXCCSR_GEN002	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Acute and unspecified renal failure	1	-0.4387138106	0.1885705092	-2.3265239741	0.0200
IQ11s1_d_DXCCSR_GEN003	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Chronic kidney disease	1	-0.4447799910	0.1922188403	-2.3139250564	0.0207
IQ11s1_d_DXCCSR_RSP012	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Respiratory failure; insufficiency; arrest	1	0.0981954208	0.2285510753	0.4296432236	0.6675
IQ11s1_d_DXCCSR_SYM003	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Shock	1	-0.3511920498	0.3355654262	-1.0465680384	0.2953
IQ11s1_d_IQ11_PRCCSR_CAR007	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Embolectomy, endarterectomy, and related vessel procedures (non-endovascular)	1	-0.7130878444	0.1833350983	-3.8895326152	0.0001
IQ11s1_d_IQ11_PRCCSR_CAR008	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Angioplasty and related vessel procedures (endovascular; excluding carotid)	1	-0.0448502666	0.1967024700	-0.2280106938	0.8196
IQ11s1_d_IQ11_PRCCSR_CAR012	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Vessel repair and replacement	1	-0.1968732547	0.1569847576	-1.2540915292	0.2098

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
IQ11s1_d_IQ11_PRCCSR_CAR014	Interaction between IQ11 Open Repair of Unruptured AAA Diagnosis Stratum and Peripheral arterial bypass procedures	1	-0.1388880195	0.1913746107	-0.7257390048	0.4680
IQ11s2	IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum	1	3.5446361091	0.1138724273	31.1281334076	<.0001
IQ11s2_TRNSFER	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	-0.8691331251	0.1713704405	-5.0716630168	<.0001
IQ11s2_d_DXCCSR_CIR008	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Hypertension with complications and secondary hypertension	1	-0.4827655427	0.2020552160	-2.3892753287	0.0169
IQ11s2_d_DXCCSR_CIR019	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Heart failure	1	-0.5875599207	0.1640639184	-3.5812866494	0.0003
IQ11s2_d_DXCCSR_DIG025	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Other specified and unspecified gastrointestinal disorders	1	-0.5210735480	0.1775773025	-2.9343476927	0.0033
IQ11s2_d_DXCCSR_END008	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Malnutrition	1	-1.034595201	0.2212115148	-4.6769500300	<.0001
IQ11s2_d_DXCCSR_END010	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Disorders of lipid metabolism	1	0.2927651099	0.1172498116	2.4969345873	0.0125
IQ11s2_d_DXCCSR_END011	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Fluid and electrolyte disorders	1	-0.4535085276	0.1498628898	-3.0261562968	0.0025
IQ11s2_d_DXCCSR_FAC009	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Implant, device or graft related encounter	1	0.4146600131	0.1336786145	3.1019173466	0.0019
IQ11s2_d_DXCCSR_GEN002	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Acute and unspecified renal failure	1	-0.7988979602	0.1667502153	-4.7909860784	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
IQ11s2_d_DXCCSR_GEN003	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Chronic kidney disease	1	-0.3666478074	0.1831516570	-2.0018809185	0.0453
IQ11s2_d_DXCCSR_RSP012	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Respiratory failure; insufficiency; arrest	1	-0.2694932109	0.1802385453	-1.4952029849	0.1349
IQ11s2_d_DXCCSR_SYM003	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Shock	1	-0.7634406225	0.2635830063	-2.8963954590	0.0038
IQ11s2_d_IQ11_PRCCSR_CAR007	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Embolectomy, endarterectomy, and related vessel procedures (non-endovascular)	1	-0.7640948722	0.2275596285	-3.3577786943	0.0008
IQ11s2_d_IQ11_PRCCSR_CAR008	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Angioplasty and related vessel procedures (endovascular; excluding carotid)	1	-0.6735908527	0.1479241387	-4.5536236249	<.0001
IQ11s2_d_IQ11_PRCCSR_CAR012	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Vessel repair and replacement	1	-0.1293877632	0.1964639054	-0.6585828726	0.5102
IQ11s2_d_IQ11_PRCCSR_CAR014	Interaction between IQ11 Endovascular Repair of Ruptured AAA Diagnosis Stratum and Peripheral arterial bypass procedures	1	-0.3491828357	0.2379671218	-1.4673574778	0.1423
Intercept	Intercept	1	-4.980771183	0.1355965400	-36.7322881823	<.0001

c-statistic=0.927

C-statistics for hospital level indicators are based on the test data (a random sample of 2019-2021 HCUP reference population, not used for the HGLR feature selection).
C-statistics for area level indicators are based on the full reference population data (2021 HCUP reference population).

Table 4. Risk Adjustment Coefficients for IQI 12 - Coronary Artery Bypass Graft (CABG) Mortality Rate

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
Age_40_44	40 <= Age <= 44	1	-0.4418075626	0.1008305352	-4.3816841973	<.0001
Age_45_49	45 <= Age <= 49	1	-0.4987515414	0.0717459269	-6.9516356234	<.0001
Age_50_54	50 <= Age <= 54	1	-0.2708849224	0.0511022899	-5.3008372581	<.0001
Age_55_59	55 <= Age <= 59	1	-0.2459197593	0.0703236309	-3.4969718743	0.0005
Age_60_64	60 <= Age <= 64	1	-0.1886141587	0.0359365221	-5.2485368024	<.0001
Age_70_74	70 <= Age <= 74	1	0.2340112946	0.0307587161	7.6079669272	<.0001
Age_75_79	75 <= Age <= 79	1	0.4599079346	0.0334262493	13.7588854157	<.0001
Age_80_84	80 <= Age <= 84	1	0.7369831159	0.0392444337	18.7793031058	<.0001
Age_85_89	85 <= Age <= 89	1	0.8213272599	0.0978083090	8.3973158147	<.0001
Age_90Plus	Age >= 90	1	1.2235303435	0.3142033506	3.8940715971	<.0001
MALE	Patient Sex Flag: 1=Male / 0=Female	1	-0.4311084508	0.0235221096	-18.3277970246	<.0001
Age_55_59_MALE	55 <= Age <= 59 MALE	1	-0.0547792511	0.0786434327	-0.6965521364	0.4861
Age_85_89_MALE	85 <= Age <= 89 MALE	1	0.2026478395	0.1184818556	1.7103702374	0.0872
Age_90Plus_MALE	Age >= 90 MALE	1	0.3961090572	0.3612769280	1.0964139319	0.2729
MDC_4	Diseases and disorders of the respiratory system	1	0.6442113955	0.2025431297	3.1806134157	0.0015
MDC_21	Injuries, poisonings and toxic effects of drugs	1	0.5447637559	0.2891701015	1.8838868647	0.0596
d_DXCCSR_BLD003	Aplastic anemia	1	0.1015487758	0.0328647543	3.0898991327	0.0020
d_DXCCSR_BLD006	Occlusion or stenosis of precerebral or cerebral arteries without infarction	1	0.2253601773	0.0328752777	6.8550045262	<.0001
d_DXCCSR_CIR001	Chronic rheumatic heart disease	1	0.2362462715	0.0335287958	7.0460708842	<.0001
d_DXCCSR_CIR006	Pericarditis and pericardial disease	1	0.2635398156	0.0536015401	4.9166463306	<.0001
d_DXCCSR_CIR007	Essential hypertension	1	-0.5314339020	0.0403437326	-13.1726508285	<.0001
d_DXCCSR_CIR008	Hypertension with complications and secondary hypertension	1	-0.4017583005	0.0360747497	-11.1368284892	<.0001
d_DXCCSR_CIR009	Acute myocardial infarction	1	0.3758030717	0.0240431380	15.6303670398	<.0001
d_DXCCSR_CIR011	Coronary atherosclerosis and other heart disease	1	-0.8858030990	0.0425570006	-20.8145096346	<.0001
d_DXCCSR_CIR014	Pulmonary heart disease	1	0.1994961074	0.0342471952	5.8251808946	<.0001
d_DXCCSR_CIR016	Conduction disorders	1	-0.1440838892	0.0347458998	-4.1467882511	<.0001
d_DXCCSR_CIR017	Cardiac dysrhythmias	1	0.0734116366	0.0250115646	2.9351077344	0.0033
d_DXCCSR_CIR019	Heart failure	1	0.5174186900	0.0306670632	16.8721304210	<.0001
d_DXCCSR_CIR026	Peripheral and visceral vascular disease	1	0.2260198080	0.0330060047	6.8478390601	<.0001
d_DXCCSR_CIR027	Arterial dissections	1	1.1266999563	0.0606965188	18.5628431133	<.0001
d_DXCCSR_CIR032	Other specified and unspecified circulatory disease	1	0.1546184602	0.0384889401	4.0172179255	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_DIG004	Esophageal disorders	1	-0.1684463447	0.0259042501	-6.5026528218	<.0001
d_DXCCSR_END002	Diabetes mellitus without complication	1	-0.0571767994	0.0451163680	-1.2673183111	0.2050
d_DXCCSR_END005	Diabetes mellitus, Type 2	1	-0.1356326077	0.0266826266	-5.0831805071	<.0001
d_DXCCSR_END008	Malnutrition	1	0.1793331649	0.0504836600	3.5523011806	0.0004
d_DXCCSR_END010	Disorders of lipid metabolism	1	-0.7031799874	0.0262268056	-26.8114996221	<.0001
d_DXCCSR_END011	Fluid and electrolyte disorders	1	0.3425502139	0.0274248350	12.4905113961	<.0001
d_DXCCSR_FAC009	Implant, device or graft related encounter	1	-0.1644203658	0.0257111573	-6.3949033341	<.0001
d_DXCCSR_FAC022	Acquired absence of limb or organ	1	-0.2681970054	0.0408267144	-6.5691547694	<.0001
d_DXCCSR_GEN002	Acute and unspecified renal failure	1	0.0655746664	0.0303421997	2.1611704873	0.0307
d_DXCCSR_GEN003	Chronic kidney disease	1	0.5292853827	0.0301014681	17.5833743732	<.0001
d_DXCCSR_GEN006	Other specified and unspecified diseases of kidney and ureters	1	0.1086679248	0.0483395850	2.2480111240	0.0246
d_DXCCSR_GEN012	Hyperplasia of prostate	1	-0.4301853919	0.0420370722	-10.2334765240	<.0001
d_DXCCSR_INJ033	Complication of cardiovascular device, implant or graft, initial encounter	1	0.2763997219	0.0369856032	7.4731705940	<.0001
d_DXCCSR_MAL001	Cardiac and circulatory congenital anomalies	1	-0.3715692188	0.0559368420	-6.6426563476	<.0001
d_DXCCSR_MBD005	Anxiety and fear-related disorders	1	-0.2318780738	0.0370911480	-6.2515744714	<.0001
d_DXCCSR_MBD024	Tobacco-related disorders	1	-0.1203809809	0.0313438539	-3.8406566499	0.0001
d_DXCCSR_MUS006	Osteoarthritis	1	-0.2247802541	0.0438632531	-5.1245687080	<.0001
d_DXCCSR_NVS015	Polyneuropathies	1	-0.1891083285	0.0413901606	-4.5689198978	<.0001
d_DXCCSR_NVS016	Sleep wake disorders	1	-0.1615844128	0.0312973012	-5.1628864715	<.0001
d_DXCCSR_RSP008	Chronic obstructive pulmonary disease and bronchiectasis	1	0.1622605243	0.0283133504	5.7308839223	<.0001
d_DXCCSR_RSP011	Pleurisy, pleural effusion and pulmonary collapse	1	-0.2495476175	0.0467084873	-5.3426610883	<.0001
d_DXCCSR_RSP012	Respiratory failure; insufficiency; arrest	1	0.0887437333	0.0371868322	2.3864289595	0.0170
d_DXCCSR_RSP016	Other specified and unspecified lower respiratory disease	1	0.2343009624	0.0523943311	4.4718762051	<.0001
d_DXCCSR_SYM003	Shock	1	0.1658666513	0.0806035436	2.0578084275	0.0396
d_DXCCSR_SYM017	Abnormal findings without diagnosis	1	-0.3846362207	0.0437505302	-8.7915784990	<.0001
d_IQ12_PRCCSR_CAR002	Heart conduction mechanism procedures	1	0.1082900412	0.0549825162	1.9695359307	0.0489
d_IQ12_PRCCSR_CAR003	Coronary artery bypass grafts (CABG)	1	-0.5150480508	0.1310981671	-3.9287204568	<.0001
d_IQ12_PRCCSR_CAR004	Percutaneous coronary interventions (PCI)	1	0.5242877391	0.0529023244	9.9104858808	<.0001
d_IQ12_PRCCSR_CAR005	Other coronary artery procedures (excluding CABG and PCI)	1	0.5953362051	0.0686199333	8.6758493765	<.0001
d_IQ12_PRCCSR_CAR009	Left atrial appendage procedures	1	0.0488854400	0.0360085698	1.3576057129	0.1746
d_IQ12_PRCCSR_CAR012	Vessel repair and replacement	1	0.8424033196	0.0496669483	16.9610444829	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_IQ12_PRCCSR_CAR017	Pericardial procedures	1	0.4642890783	0.0701545842	6.6180860970	<.0001
d_IQ12_PRCCSR_CAR019	Septal repair and other therapeutic heart procedures	1	0.8633377920	0.0560850756	15.3933605875	<.0001
d_IQ12_PRCCSR_CAR022	Heart valve replacement and other valve procedures (non-endovascular)	1	0.5142425243	0.0308402010	16.6744219705	<.0001
d_IQ12_PRCCSR_CAR027	Heart assist device procedures	1	1.9391708140	0.0591854663	32.7643074507	<.0001
d_IQ12_PRCCSR_CAR029	Cardiovascular device procedures, NEC	1	0.5493034367	0.0994449134	5.5236956629	<.0001
d_IQ12_PRCCSR_GNR007	Mediastinal procedures, NEC	1	0.6977317877	0.0797148276	8.7528482358	<.0001
TRNSFER	TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	0.0095193131	0.0292600975	0.3253342914	0.7449
CSHOCKANOXBDD	Cardiogenic shock, anoxic brain injury, or cardiac arrest	1	0.2616717649	0.0808051578	3.2383052284	0.0012
COVIDDX_Q2	COVID, Quarter 2, 2020	1	1.5812929767	0.4967997376	3.1829585588	0.0015
COVIDDX_Q3	COVID, Quarter 3, 2020	1	1.1176686307	0.3689159411	3.0296024275	0.0024
COVIDDX_Q4	COVID, Quarter 4, 2020	1	0.7886642178	0.3511994980	2.2456302540	0.0247
COVIDDX_Q5	COVID, Quarter 1, 2021	1	0.9809289208	0.2152768861	4.5565919246	<.0001
COVIDDX_Q6	COVID, Quarter 2, 2021	1	0.5045547749	0.3772424888	1.3374813014	0.1811
COVIDDX_Q7	COVID, Quarter 3, 2021	1	1.2294509615	0.4474779431	2.7475118726	0.0060
COVIDDX_Q8	COVID, Quarter 4, 2021	1	0.9644591238	0.3685189777	2.6171219999	0.0089
YEAR_2019	Discharge YEAR is 2019 or before 2019	1	-0.0738512300	0.0397470081	-1.8580324304	0.0632
Q1	Quarter 1, 2020	1	-0.0567905272	0.0482667885	-1.1765963516	0.2394
Q2	Quarter 2, 2020	1	-0.0156844123	0.0511552456	-0.3066041844	0.7591
Q3	Quarter 3, 2020	1	0.0651077383	0.0461689009	1.4102076750	0.1585
Q4	Quarter 4, 2020	1	0.0434816628	0.0474779057	0.9158294193	0.3598
Q5	Quarter 1, 2021	1	0.0739429840	0.0454392587	1.6272929210	0.1037
Q6	Quarter 2, 2021	1	-0.1088217022	0.0487295177	-2.2331783155	0.0255
Q7	Quarter 3, 2021	1	0.0042903514	0.0465205519	0.0922248601	0.9265
Intercept	Intercept	1	-2.126159632	0.1428025287	-14.8888094095	<.0001

c-statistic=0.837

C-statistics for hospital level indicators are based on the test data (a random sample of 2019-2021 HCUP reference population, not used for the LASSO feature selection).
C-statistics for area level indicators are based on the full reference population data (2021 HCUP reference population).

Table 5. Risk Adjustment Coefficients for IQI 15 - Acute Myocardial Infarction (AMI) Mortality Rate

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
Age_LT30	Age < 30	1	-1.432494709	0.1320172066	-10.8508182110	<.0001
Age_30_34	30 <= Age <= 34	1	-0.8436477348	0.1520224319	-5.5494950579	<.0001
Age_35_39	35 <= Age <= 39	1	-0.9132242089	0.1041313172	-8.7699285240	<.0001
Age_40_44	40 <= Age <= 44	1	-0.9190950075	0.0733804549	-12.5250655429	<.0001
Age_45_49	45 <= Age <= 49	1	-0.8307543459	0.0572515544	-14.5105989544	<.0001
Age_50_54	50 <= Age <= 54	1	-0.6773534587	0.0260853083	-25.9668565701	<.0001
Age_55_59	55 <= Age <= 59	1	-0.4149095852	0.0329265686	-12.6010575242	<.0001
Age_60_64	60 <= Age <= 64	1	-0.1745203131	0.0290759625	-6.0022196297	<.0001
Age_70_74	70 <= Age <= 74	1	0.2551275237	0.0169392590	15.0613154555	<.0001
Age_75_79	75 <= Age <= 79	1	0.4076210157	0.0243164602	16.7631724646	<.0001
Age_80_84	80 <= Age <= 84	1	0.5551510637	0.0246618803	22.5104921481	<.0001
Age_85_89	85 <= Age <= 89	1	0.6383341298	0.0261813447	24.3812583323	<.0001
Age_90Plus	Age >= 90	1	0.6430778343	0.0267344130	24.0543090953	<.0001
MALE	Patient Sex Flag: 1=Male / 0=Female	1	-0.1374753283	0.0170625423	-8.0571421388	<.0001
Age_30_34_MALE	30 <= Age <= 34 MALE	1	-0.4027019262	0.1894643423	-2.1254760726	0.0335
Age_35_39_MALE	35 <= Age <= 39 MALE	1	-0.3317244308	0.1230436188	-2.6959905268	0.0070
Age_40_44_MALE	40 <= Age <= 44 MALE	1	-0.1478823090	0.0902704632	-1.6382136943	0.1014
Age_45_49_MALE	Occlusion or stenosis of precerebral or cerebral arteries without infarction	1	-0.0613482363	0.0659016207	-0.9309063371	0.3519
Age_55_59_MALE	55 <= Age <= 59 MALE	1	-0.0729403489	0.0390814321	-1.8663683737	0.0620
Age_60_64_MALE	60 <= Age <= 64 MALE	1	-0.1061214218	0.0333299546	-3.1839653889	0.0015
Age_75_79_MALE	75 <= Age <= 79 MALE	1	0.1084776695	0.0283071250	3.8321683855	0.0001
Age_80_84_MALE	80 <= Age <= 84 MALE	1	0.2083243603	0.0286743832	7.2651732106	<.0001
Age_85_89_MALE	85 <= Age <= 89 MALE	1	0.2864520201	0.0305275269	9.3834007941	<.0001
Age_90Plus_MALE	Age >= 90 MALE	1	0.3734974269	0.0325221065	11.4844168374	<.0001
d_DXCCSR_BLD001	Nutritional anemia	1	-0.2628304109	0.0228790685	-11.4878108066	<.0001
d_DXCCSR_BLD006	Coagulation and hemorrhagic disorders	1	0.2505694269	0.0190073324	13.1827771647	<.0001
d_DXCCSR_CIR003	Nonrheumatic and unspecified valve disorders	1	0.1431445961	0.0139416793	10.2673855173	<.0001
d_DXCCSR_CIR005	Myocarditis and cardiomyopathy	1	-0.1050113723	0.0119157735	-8.8128036791	<.0001
d_DXCCSR_CIR006	Pericarditis and pericardial disease	1	0.4050890172	0.0310607238	13.0418408556	<.0001
d_DXCCSR_CIR007	Essential hypertension	1	-0.2845133412	0.0148297228	-19.1853445338	<.0001
d_DXCCSR_CIR008	Hypertension with complications and secondary hypertension	1	-0.2897706411	0.0144589474	-20.0409222169	<.0001
d_DXCCSR_CIR009	Acute myocardial infarction	1	-0.2537112180	0.0435443825	-5.8264970972	<.0001
d_DXCCSR_CIR010	Complications of acute myocardial infarction	1	0.6671276832	0.0478307663	13.9476687206	<.0001
d_DXCCSR_CIR011	Coronary atherosclerosis and other heart disease	1	-0.4828964611	0.0126096131	-38.2958983744	<.0001
d_DXCCSR_CIR013	Acute pulmonary embolism	1	0.3730764024	0.0443189973	8.4179793052	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_CIR014	Pulmonary heart disease	1	0.0632057739	0.0174106368	3.6302964987	0.0003
d_DXCCSR_CIR015	Other and ill-defined heart disease	1	-0.2252746167	0.0294833730	-7.6407342042	<.0001
d_DXCCSR_CIR016	Conduction disorders	1	0.0933616881	0.0121226987	7.7013947361	<.0001
d_DXCCSR_CIR018	Cardiac arrest and ventricular fibrillation	1	1.1172032332	0.0219918227	50.8008476679	<.0001
d_DXCCSR_CIR019	Heart failure	1	0.3259951039	0.0141228377	23.0828330060	<.0001
d_DXCCSR_CIR020	Cerebral infarction	1	0.1947229079	0.0436667218	4.4592976000	<.0001
d_DXCCSR_CIR025	Sequela of cerebral infarction and other cerebrovascular disease	1	0.1624901413	0.0260441337	6.2390303825	<.0001
d_DXCCSR_CIR026	Peripheral and visceral vascular disease	1	0.2776122398	0.0171610652	16.1768652478	<.0001
d_DXCCSR_CIR031	Hypotension	1	0.3870752391	0.0180174300	21.4833769362	<.0001
d_DXCCSR_CIR032	Other specified and unspecified circulatory disease	1	0.2093223281	0.0173764991	12.0462888936	<.0001
d_DXCCSR_DIG004	Esophageal disorders	1	-0.1631033490	0.0126705118	-12.8726725401	<.0001
d_DXCCSR_DIG010	Abdominal hernia	1	-0.1831487871	0.0379611225	-4.8246409818	<.0001
d_DXCCSR_DIG018	Hepatic failure	1	0.5416618515	0.0256354818	21.1293805777	<.0001
d_DXCCSR_DIG019	Other specified and unspecified liver disease	1	0.1562810241	0.0252591055	6.1871163267	<.0001
d_DXCCSR_DIG021	Gastrointestinal hemorrhage	1	0.3505315039	0.0272327363	12.8716960254	<.0001
d_DXCCSR_DIG025	Other specified and unspecified gastrointestinal disorders	1	-0.1488142451	0.0247026055	-6.0242327577	<.0001
d_DXCCSR_END001	Thyroid disorders	1	-0.1228055818	0.0130965825	-9.3769181487	<.0001
d_DXCCSR_END003	Diabetes mellitus with complication	1	0.1061119841	0.0178599296	5.9413439333	<.0001
d_DXCCSR_END005	Diabetes mellitus, Type 2	1	0.0899429214	0.0159339468	5.6447359010	<.0001
d_DXCCSR_END007	Nutritional deficiencies	1	-0.2790145117	0.0345776276	-8.0692207872	<.0001
d_DXCCSR_END009	Obesity	1	-0.1102866940	0.0137093239	-8.0446486236	<.0001
d_DXCCSR_END010	Disorders of lipid metabolism	1	-0.4379638119	0.0109981518	-39.8215828714	<.0001
d_DXCCSR_END011	Fluid and electrolyte disorders	1	0.4829480296	0.0110010923	43.9000070267	<.0001
d_DXCCSR_END016	Other specified and unspecified nutritional and metabolic disorders	1	-0.2046111446	0.0192314491	-10.6394033946	<.0001
d_DXCCSR_FAC022	Acquired absence of limb or organ	1	-0.1501079378	0.0161046853	-9.3207619320	<.0001
d_DXCCSR_GEN002	Acute and unspecified renal failure	1	0.3538941648	0.0115395869	30.6678365266	<.0001
d_DXCCSR_GEN003	Chronic kidney disease	1	0.3273061027	0.0136880016	23.9118982703	<.0001
d_DXCCSR_GEN004	Urinary tract infections	1	-0.1947757439	0.0216297815	-9.0049797442	<.0001
d_DXCCSR_GEN012	Hyperplasia of prostate	1	-0.2789062262	0.0189923532	-14.6851853319	<.0001
d_DXCCSR_INF002	Septicemia	1	0.7247220522	0.0378309343	19.1568637295	<.0001
d_DXCCSR_INF003	Bacterial infections	1	-0.3325801049	0.0288885399	-11.5125273165	<.0001
d_DXCCSR_INJ003	Fracture of torso, initial encounter	1	-0.3262312096	0.0539943263	-6.0419535126	<.0001
d_DXCCSR_INJ028	Adverse effects of drugs and medicaments, initial encounter	1	-0.4250900987	0.0356273753	-11.9315581258	<.0001
d_DXCCSR_INJ030	Drug induced or toxic related condition	1	-0.1641256892	0.0389270767	-4.2162346444	<.0001
d_DXCCSR_MBD002	Depressive disorders	1	-0.0679511182	0.0177327318	-3.8319599652	0.0001
d_DXCCSR_MBD005	Anxiety and fear-related disorders	1	-0.1118681569	0.0161625473	-6.9214434470	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_MBD024	Tobacco-related disorders	1	-0.2521816471	0.0138759509	-18.1740083021	<.0001
d_DXCCSR_MUS006	Osteoarthritis	1	-0.1125027871	0.0183751965	-6.1225351702	<.0001
d_DXCCSR_MUS010	Musculoskeletal pain, not low back pain	1	-0.1636519571	0.0321237518	-5.0944222827	<.0001
d_DXCCSR_MUS011	Spondylopathies/spondyloarthropathy (including infective)	1	-0.2184230067	0.0306125152	-7.1350885384	<.0001
d_DXCCSR_MUS033	Gout	1	-0.1440398257	0.0243867799	-5.9064717252	<.0001
d_DXCCSR_NEO022	Respiratory cancers	1	0.3762796652	0.0422005709	8.9164591237	<.0001
d_DXCCSR_NEO070	Secondary malignancies	1	0.5722192813	0.0342489712	16.7076341694	<.0001
d_DXCCSR_NVS009	Epilepsy; convulsions	1	0.2424277356	0.0260865057	9.2932237937	<.0001
d_DXCCSR_NVS013	Coma; stupor; and brain damage	1	1.3005222596	0.0281553887	46.1908827563	<.0001
d_DXCCSR_NVS016	Sleep wake disorders	1	-0.2073373006	0.0159692189	-12.9835592922	<.0001
d_DXCCSR_NVS019	Nervous system pain and pain syndromes	1	-0.1457428233	0.0222798464	-6.5414644506	<.0001
d_DXCCSR_NVS020	Other nervous system disorders (neither hereditary nor degenerative)	1	0.1967511469	0.0160572195	12.2531267960	<.0001
d_DXCCSR_RSP002	Pneumonia (except that caused by tuberculosis)	1	0.1430828222	0.0179094393	7.9892407515	<.0001
d_DXCCSR_RSP009	Asthma	1	-0.2071267570	0.0252885784	-8.1905259176	<.0001
d_DXCCSR_RSP010	Aspiration pneumonitis	1	-0.3143816204	0.0285750554	-11.0019601487	<.0001
d_DXCCSR_RSP012	Respiratory failure; insufficiency; arrest	1	0.7849280366	0.0126385417	62.1059024166	<.0001
d_DXCCSR_RSP016	Other specified and unspecified lower respiratory disease	1	0.3537891487	0.0223829219	15.8062093484	<.0001
d_DXCCSR_SYM003	Shock	1	1.3483639213	0.0170140764	79.2499038964	<.0001
d_DXCCSR_SYM005	Dysphagia	1	-0.4461915689	0.0424405280	-10.5133369065	<.0001
d_DXCCSR_SYM006	Abdominal pain and other digestive/abdomen signs and symptoms	1	0.1530547898	0.0292212056	5.2377986071	<.0001
d_DXCCSR_SYM007	Malaise and fatigue	1	-0.2773999089	0.0362976131	-7.6423732920	<.0001
d_DXCCSR_SYM010	Nervous system signs and symptoms	1	0.2512240685	0.0246886883	10.1756750121	<.0001
d_DXCCSR_SYM011	Genitourinary signs and symptoms	1	-0.1733322264	0.0335393165	-5.1680309783	<.0001
d_DXCCSR_SYM013	Respiratory signs and symptoms	1	0.1075593574	0.0240356098	4.4750001566	<.0001
d_DXCCSR_SYM016	Other general signs and symptoms	1	0.1758421172	0.0197652773	8.8965165854	<.0001
d_DXCCSR_SYM017	Abnormal findings without diagnosis	1	-0.1553320996	0.0151019707	-10.2855516235	<.0001
TRNSFER	TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	0.1690342986	0.0170516997	9.9130468865	<.0001
DNR	Do not resuscitate flag	1	0.8194931877	0.0157180239	52.1371640073	<.0001
MRTAMISTD	STEMI AMI	1	0.7661520542	0.0108600089	70.5480136816	<.0001
COVIDDX_Q1	COVID, Quarter 1, 2020	1	0.6860926841	0.3657712145	1.8757426962	0.0607
COVIDDX_Q2	COVID, Quarter 2, 2020	1	0.9469418628	0.1358069877	6.9727035343	<.0001
COVIDDX_Q3	COVID, Quarter 3, 2020	1	0.6778734438	0.1104964126	6.1348004698	<.0001
COVIDDX_Q4	COVID, Quarter 4, 2020	1	0.7590116482	0.0758068026	10.0124477259	<.0001
COVIDDX_Q5	COVID, Quarter 1, 2021	1	0.5292751290	0.0671231819	7.8851316987	<.0001
COVIDDX_Q6	COVID, Quarter 2, 2021	1	0.6681615392	0.1251960508	5.3369218523	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
COVIDDX_Q7	COVID, Quarter 3, 2021	1	0.9229293933	0.0827956896	11.1470705582	<.0001
COVIDDX_Q8	COVID, Quarter 4, 2021	1	0.7888577970	0.0773895652	10.1933354336	<.0001
YEAR_2019	Discharge YEAR is 2019 or before 2019	1	-0.0780916123	0.0179590282	-4.3483206015	<.0001
Q1	Quarter 1, 2020	1	-0.0811199181	0.0215861909	-3.7579542575	0.0002
Q2	Quarter 2, 2020	1	-0.0438423824	0.0229216531	-1.9127059611	0.0558
Q3	Quarter 3, 2020	1	-0.0740250871	0.0222680430	-3.3242744795	0.0009
Q4	Quarter 4, 2020	1	0.0247200760	0.0215675221	1.1461713527	0.2517
Q5	Quarter 1, 2021	1	0.0363790231	0.0221591984	1.6417120540	0.1006
Q6	Quarter 2, 2021	1	-0.0952783226	0.0213647585	-4.4596021438	<.0001
Q7	Quarter 3, 2021	1	-0.0580229758	0.0212157252	-2.7349041899	0.0062
Intercept	Intercept	1	-3.219756608	0.0521424745	-61.7492099927	<.0001

c-statistic=0.887

C-statistics for hospital level indicators are based on the test data (a random sample of 2019-2021 HCUP reference population, not used for the LASSO feature selection).
C-statistics for area level indicators are based on the full reference population data (2021 HCUP reference population).

Table 6. Risk Adjustment Coefficients for IQI 16 - Heart Failure Mortality Rate

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
Age_LT30	Age < 30	1	-0.7708988270	0.0739923128	-10.4186340220	<.0001
Age_30_34	30 <= Age <= 34	1	-0.6510905451	0.0632947848	-10.2866381078	<.0001
Age_35_39	35 <= Age <= 39	1	-0.7091485991	0.0906894593	-7.8195261605	<.0001
Age_40_44	40 <= Age <= 44	1	-0.5942655964	0.0411457992	-14.4429226837	<.0001
Age_45_49	45 <= Age <= 49	1	-0.4927034755	0.0330671989	-14.9000668910	<.0001
Age_50_54	50 <= Age <= 54	1	-0.4377808074	0.0279546580	-15.6603886177	<.0001
Age_55_59	55 <= Age <= 59	1	-0.2912191361	0.0217279900	-13.4029487298	<.0001
Age_60_64	60 <= Age <= 64	1	-0.1059025498	0.0269049345	-3.9361757117	<.0001
Age_70_74	70 <= Age <= 74	1	0.1407664696	0.0219074064	6.4255196170	<.0001
Age_75_79	75 <= Age <= 79	1	0.2406530957	0.0216809492	11.0997490626	<.0001
Age_80_84	80 <= Age <= 84	1	0.2961716864	0.0210123457	14.0951272573	<.0001
Age_85_89	85 <= Age <= 89	1	0.2979636667	0.0221993927	13.4221539652	<.0001
Age_90Plus	Age >= 90	1	0.3500005996	0.0229163809	15.2729438721	<.0001
MALE	Patient Sex Flag: 1=Male / 0=Female	1	0.0400062171	0.0179349455	2.2306294244	0.0257
Age_35_39_MALE	35 <= Age <= 39 MALE	1	0.0116845963	0.1088378430	0.1073578452	0.9145
Age_60_64_MALE	60 <= Age <= 64 MALE	1	-0.0403183589	0.0338211647	-1.1921043894	0.2332
Age_70_74_MALE	70 <= Age <= 74 MALE	1	0.0950107360	0.0269086030	3.5308683983	0.0004
Age_75_79_MALE	Occlusion or stenosis of precerebral or cerebral arteries without infarction	1	0.1372744686	0.0264645485	5.1871079078	<.0001
Age_80_84_MALE	80 <= Age <= 84 MALE	1	0.2038811870	0.0255335448	7.9848367489	<.0001
Age_85_89_MALE	85 <= Age <= 89 MALE	1	0.2476114876	0.0253051585	9.7850202225	<.0001
Age_90Plus_MALE	Age >= 90 MALE	1	0.2309313289	0.0271327116	8.5111776518	<.0001
d_DXCCSR_BLD001	Nutritional anemia	1	-0.2716212035	0.0146976207	-18.4806240989	<.0001
d_DXCCSR_BLD003	Aplastic anemia	1	-0.1291363173	0.0102676527	-12.5770048507	<.0001
d_DXCCSR_BLD004	Acute posthemorrhagic anemia	1	0.0919061339	0.0277069102	3.3170834755	0.0009
d_DXCCSR_BLD006	Coagulation and hemorrhagic disorders	1	0.3189077578	0.0147636264	21.6009094327	<.0001
d_DXCCSR_BLD007	Diseases of white blood cells	1	-0.0753020824	0.0228016703	-3.3024809808	0.0010
d_DXCCSR_CIR008	Hypertension with complications and secondary hypertension	1	-0.3031845397	0.0175257841	-17.2993424084	<.0001
d_DXCCSR_CIR009	Acute myocardial infarction	1	0.3688709509	0.0151099584	24.4124398742	<.0001
d_DXCCSR_CIR013	Acute pulmonary embolism	1	0.4306589682	0.0327081613	13.1667128547	<.0001
d_DXCCSR_CIR014	Pulmonary heart disease	1	0.0958426722	0.0107180644	8.9421623507	<.0001
d_DXCCSR_CIR016	Conduction disorders	1	-0.0995951947	0.0107051594	-9.3034761058	<.0001
d_DXCCSR_CIR017	Cardiac dysrhythmias	1	0.1184992552	0.0095013052	12.4718923544	<.0001
d_DXCCSR_CIR018	Cardiac arrest and ventricular fibrillation	1	2.3033958989	0.0373015256	61.7507155735	<.0001
d_DXCCSR_CIR026	Peripheral and visceral vascular disease	1	0.0684532644	0.0151966564	4.5044951136	<.0001
d_DXCCSR_CIR031	Hypotension	1	0.4653392251	0.0149662333	31.0926080379	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_CIR032	Other specified and unspecified circulatory disease	1	0.1296473294	0.0148191644	8.7486261866	<.0001
d_DXCCSR_CIR033	Acute phlebitis; thrombophlebitis and thromboembolism	1	0.1013351393	0.0306296362	3.3084016564	0.0009
d_DXCCSR_CIR036	Postthrombotic syndrome and venous insufficiency/hypertension	1	-0.1691804534	0.0246469783	-6.8641458391	<.0001
d_DXCCSR_DIG004	Esophageal disorders	1	-0.1351571397	0.0106165940	-12.7307439155	<.0001
d_DXCCSR_DIG010	Abdominal hernia	1	-0.2026540404	0.0292592529	-6.9261522490	<.0001
d_DXCCSR_DIG018	Hepatic failure	1	0.7908804586	0.0266835728	29.6392265228	<.0001
d_DXCCSR_DIG019	Other specified and unspecified liver disease	1	0.1827678152	0.0158510785	11.5303078826	<.0001
d_DXCCSR_DIG021	Gastrointestinal hemorrhage	1	0.3933163709	0.0247965685	15.8617258410	<.0001
d_DXCCSR_DIG025	Other specified and unspecified gastrointestinal disorders	1	-0.1460145537	0.0177536232	-8.2244932340	<.0001
d_DXCCSR_END001	Thyroid disorders	1	-0.0578389805	0.0099126553	-5.8348624562	<.0001
d_DXCCSR_END005	Diabetes mellitus, Type 2	1	-0.1208424630	0.0095346586	-12.6740209482	<.0001
d_DXCCSR_END007	Nutritional deficiencies	1	-0.2805027701	0.0251645558	-11.1467403886	<.0001
d_DXCCSR_END008	Malnutrition	1	0.4127232819	0.0166829318	24.7392536759	<.0001
d_DXCCSR_END009	Obesity	1	-0.0879069214	0.0105997871	-8.2932723263	<.0001
d_DXCCSR_END010	Disorders of lipid metabolism	1	-0.2943110099	0.0103930404	-28.3180857386	<.0001
d_DXCCSR_END011	Fluid and electrolyte disorders	1	0.3547674650	0.0098246505	36.1099324905	<.0001
d_DXCCSR_END015	Other specified and unspecified endocrine disorders	1	0.1651635772	0.0278907319	5.9218086518	<.0001
d_DXCCSR_END016	Other specified and unspecified nutritional and metabolic disorders	1	-0.1331499455	0.0144292191	-9.2277998041	<.0001
d_DXCCSR_EYE005	Retinal and vitreous conditions	1	-0.0470270127	0.0236367588	-1.9895711198	0.0466
d_DXCCSR_EYE010	Blindness and vision defects	1	-0.1755051425	0.0327029880	-5.3666393536	<.0001
d_DXCCSR_FAC009	Implant, device or graft related encounter	1	-0.2217047212	0.0109012052	-20.3376339497	<.0001
d_DXCCSR_FAC022	Acquired absence of limb or organ	1	-0.3172604839	0.0147050013	-21.5750055382	<.0001
d_DXCCSR_GEN001	Nephritis; nephrosis; renal sclerosis	1	-0.1509085493	0.0251884456	-5.9911815024	<.0001
d_DXCCSR_GEN002	Acute and unspecified renal failure	1	0.4705748183	0.0102024231	46.1238291663	<.0001
d_DXCCSR_GEN003	Chronic kidney disease	1	0.3263262374	0.0101147936	32.2622734760	<.0001
d_DXCCSR_GEN008	Urinary incontinence	1	-0.1991459937	0.0343380758	-5.7995676474	<.0001
d_DXCCSR_GEN012	Hyperplasia of prostate	1	-0.2538908442	0.0143613207	-17.6787949758	<.0001
d_DXCCSR_INF002	Septicemia	1	0.7770932625	0.0359023024	21.6446637136	<.0001
d_DXCCSR_INF008	Viral infection	1	-0.1477267618	0.0231291447	-6.3870395488	<.0001
d_DXCCSR_INJ028	Adverse effects of drugs and medicaments, initial encounter	1	-0.3865088282	0.0215042764	-17.9735798516	<.0001
d_DXCCSR_INJ033	Complication of cardiovascular device, implant or graft, initial encounter	1	0.5324098471	0.0322564327	16.5055401964	<.0001
d_DXCCSR_MAL001	Cardiac and circulatory congenital anomalies	1	0.1405153117	0.0364906785	3.8507179746	0.0001
d_DXCCSR_MBD002	Depressive disorders	1	-0.1332734278	0.0130810217	-10.1883041932	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_MBD017	Alcohol-related disorders	1	-0.1739868292	0.0262442227	-6.6295287510	<.0001
d_DXCCSR_MBD021	Stimulant-related disorders	1	-0.3772852034	0.0357134685	-10.5642274282	<.0001
d_DXCCSR_MBD024	Tobacco-related disorders	1	-0.3951205286	0.0155177579	-25.4624753245	<.0001
d_DXCCSR_MUS006	Osteoarthritis	1	-0.1248974589	0.0151922899	-8.2211081824	<.0001
d_DXCCSR_MUS010	Musculoskeletal pain, not low back pain	1	-0.2026059214	0.0264475917	-7.6606567456	<.0001
d_DXCCSR_MUS011	Spondylopathies/spondyloarthropathy (including infective)	1	-0.1356076940	0.0237884267	-5.7005743077	<.0001
d_DXCCSR_MUS033	Gout	1	-0.1816778400	0.0159007602	-11.4257329842	<.0001
d_DXCCSR_NEO022	Respiratory cancers	1	0.3335156395	0.0332407615	10.0333333099	<.0001
d_DXCCSR_NEO070	Secondary malignancies	1	0.5145428118	0.0255864216	20.1099950440	<.0001
d_DXCCSR_NEO074	Conditions due to neoplasm or the treatment of neoplasm	1	0.2412282710	0.0377269936	6.3940496719	<.0001
d_DXCCSR_NVS011	Neurocognitive disorders	1	0.0443576776	0.0129675929	3.4206562395	0.0006
d_DXCCSR_NVS013	Coma; stupor; and brain damage	1	1.2199890027	0.0450931462	27.0548654442	<.0001
d_DXCCSR_NVS015	Polyneuropathies	1	-0.0770502659	0.0164261673	-4.6907026112	<.0001
d_DXCCSR_NVS016	Sleep wake disorders	1	-0.2348727072	0.0117705370	-19.9542898776	<.0001
d_DXCCSR_NVS019	Nervous system pain and pain syndromes	1	-0.1599928102	0.0182272973	-8.7776485540	<.0001
d_DXCCSR_NVS020	Other nervous system disorders (neither hereditary nor degenerative)	1	0.4854344292	0.0124352220	39.0370536908	<.0001
d_DXCCSR_RSP002	Pneumonia (except that caused by tuberculosis)	1	0.3220039913	0.0117878303	27.3166462524	<.0001
d_DXCCSR_RSP008	Chronic obstructive pulmonary disease and bronchiectasis	1	-0.0378400791	0.0089686243	-4.2191620401	<.0001
d_DXCCSR_RSP009	Asthma	1	-0.2793687353	0.0204261562	-13.6770096280	<.0001
d_DXCCSR_RSP010	Aspiration pneumonitis	1	0.7158103449	0.0277402513	25.8040324768	<.0001
d_DXCCSR_RSP011	Pleurisy, pleural effusion and pulmonary collapse	1	0.1948808362	0.0124995651	15.5910093705	<.0001
d_DXCCSR_RSP012	Respiratory failure; insufficiency; arrest	1	0.3865501672	0.0128664291	30.0433137593	<.0001
d_DXCCSR_RSP016	Other specified and unspecified lower respiratory disease	1	0.2190113709	0.0169306346	12.9358039826	<.0001
d_DXCCSR_SKN001	Skin and subcutaneous tissue infections	1	0.1629804738	0.0185433846	8.7891437925	<.0001
d_DXCCSR_SKN003	Pressure ulcer of skin	1	0.3892326367	0.0207234927	18.7821928577	<.0001
d_DXCCSR_SKN004	Non-pressure ulcer of skin	1	0.1233749476	0.0224635682	5.4922239674	<.0001
d_DXCCSR_SYM003	Shock	1	1.3157596029	0.0229341016	57.3713165660	<.0001
d_DXCCSR_SYM005	Dysphagia	1	0.1992438815	0.0222392841	8.9590960007	<.0001
d_DXCCSR_SYM006	Abdominal pain and other digestive/abdomen signs and symptoms	1	0.2456422920	0.0153279576	16.0257680093	<.0001
d_DXCCSR_SYM010	Nervous system signs and symptoms	1	0.1629083638	0.0223178805	7.2994549864	<.0001
d_DXCCSR_SYM011	Genitourinary signs and symptoms	1	-0.0485460553	0.0197313666	-2.4603493614	0.0139
d_DXCCSR_SYM012	Circulatory signs and symptoms	1	-0.0777196255	0.0206578910	-3.7622245900	0.0002
d_DXCCSR_SYM013	Respiratory signs and symptoms	1	-0.3300908585	0.0190526548	-17.3251896704	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_SYM016	Other general signs and symptoms	1	0.3290504868	0.0192317435	17.1097585170	<.0001
d_DXCCSR_SYM017	Abnormal findings without diagnosis	1	-0.1084391531	0.0133232170	-8.1391118170	<.0001
TRNSFER	TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	0.4164743972	0.0486867038	8.5541711586	<.0001
DNR	Do not resuscitate flag	1	0.8564012388	0.0192331365	44.5273830782	<.0001
COVIDDX_Q1	COVID, Quarter 1, 2020	1	1.1136489749	0.1753844942	6.3497573156	<.0001
COVIDDX_Q2	COVID, Quarter 2, 2020	1	0.7068513831	0.1382844547	5.1115751563	<.0001
COVIDDX_Q3	COVID, Quarter 3, 2020	1	0.6407982381	0.1297095127	4.9402563057	<.0001
COVIDDX_Q4	COVID, Quarter 4, 2020	1	0.8570988543	0.0818374684	10.4731838795	<.0001
COVIDDX_Q5	COVID, Quarter 1, 2021	1	0.4543283831	0.0773334628	5.8749261536	<.0001
COVIDDX_Q6	COVID, Quarter 2, 2021	1	-0.0049475391	0.1619686699	-0.0305462725	0.9756
COVIDDX_Q7	COVID, Quarter 3, 2021	1	0.7075014402	0.1027660889	6.8845807774	<.0001
COVIDDX_Q8	COVID, Quarter 4, 2021	1	0.5393796740	0.0912124128	5.9134459624	<.0001
YEAR_2019	Discharge YEAR is 2019 or before 2019	1	-0.1706831088	0.0153449375	-11.1230892325	<.0001
Q1	Quarter 1, 2020	1	-0.1098151170	0.0177198228	-6.1973033517	<.0001
Q2	Quarter 2, 2020	1	-0.1345414803	0.0193886450	-6.9391894142	<.0001
Q3	Quarter 3, 2020	1	-0.1848376142	0.0198309405	-9.3206680905	<.0001
Q4	Quarter 4, 2020	1	-0.0926441752	0.0185332949	-4.9987967895	<.0001
Q5	Quarter 1, 2021	1	-0.0691778408	0.0174601732	-3.9620363452	<.0001
Q6	Quarter 2, 2021	1	-0.2144507315	0.0184683847	-11.6117751939	<.0001
Q7	Quarter 3, 2021	1	-0.0550380350	0.0183562723	-2.9983230928	0.0027
Intercept	Intercept	1	-4.159428629	0.0386690088	-107.5649145966	<.0001

c-statistic=0.813

C-statistics for hospital level indicators are based on the test data (a random sample of 2019-2021 HCUP reference population, not used for the LASSO feature selection).
C-statistics for area level indicators are based on the full reference population data (2021 HCUP reference population).

Table 7. Risk Adjustment Coefficients for IQI 17 - Acute Stroke Mortality Rate

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
Age_LT30	Age < 30	1	-0.7520449583	0.0453880497	-16.5692283254	<.0001
Age_30_34	30 <= Age <= 34	1	-0.4534006194	0.0437445501	-10.3647338572	<.0001
Age_35_39	35 <= Age <= 39	1	-0.4155122570	0.0346421472	-11.9944140508	<.0001
Age_40_44	40 <= Age <= 44	1	-0.3449683512	0.0288852215	-11.9427282740	<.0001
Age_45_49	45 <= Age <= 49	1	-0.2397479162	0.0242992365	-9.8664794104	<.0001
Age_50_54	50 <= Age <= 54	1	-0.2034675739	0.0201802276	-10.0825212623	<.0001
Age_55_59	55 <= Age <= 59	1	-0.1444117342	0.0184684606	-7.8193703820	<.0001
Age_60_64	60 <= Age <= 64	1	-0.0534904883	0.0165432876	-3.2333650637	0.0012
Age_70_74	70 <= Age <= 74	1	0.1102215556	0.0152638322	7.2210932359	<.0001
Age_75_79	75 <= Age <= 79	1	0.2033289914	0.0154099447	13.1946606563	<.0001
Age_80_84	80 <= Age <= 84	1	0.3453248153	0.0161946836	21.3233444058	<.0001
Age_85_89	85 <= Age <= 89	1	0.4295437639	0.0171463160	25.0516650191	<.0001
Age_90Plus	Age >= 90	1	0.4807035149	0.0201131742	23.8999329836	<.0001
MALE	Patient Sex Flag: 1=Male / 0=Female	1	0.0266688670	0.0083184805	3.2059781789	0.0013
d_DXCCSR_BLD006	Coagulation and hemorrhagic disorders	1	0.2350570953	0.0181689653	12.9372857047	<.0001
d_DXCCSR_CIR007	Essential hypertension	1	-0.2442647822	0.0162603300	-15.0221294874	<.0001
d_DXCCSR_CIR008	Hypertension with complications and secondary hypertension	1	-0.1966017268	0.0151828849	-12.9489045503	<.0001
d_DXCCSR_CIR009	Occlusion or stenosis of precerebral or cerebral arteries without infarction	1	0.4366320548	0.0246491590	17.7138723149	<.0001
d_DXCCSR_CIR011	Coronary atherosclerosis and other heart disease	1	0.1454003000	0.0105488205	13.7835599246	<.0001
d_DXCCSR_CIR017	Cardiac dysrhythmias	1	0.2489581276	0.0117154744	21.2503667064	<.0001
d_DXCCSR_CIR018	Cardiac arrest and ventricular fibrillation	1	2.0207822071	0.0522447215	38.6791650427	<.0001
d_DXCCSR_CIR019	Heart failure	1	0.1437120296	0.0158384575	9.0736127255	<.0001
d_DXCCSR_CIR021	Acute hemorrhagic cerebrovascular disease	1	0.5315779824	0.0210312126	25.2756696475	<.0001
d_DXCCSR_CIR024	Other and ill-defined cerebrovascular disease	1	-0.2570512558	0.0198174595	-12.9709489546	<.0001
d_DXCCSR_CIR031	Hypotension	1	0.4005373189	0.0211996358	18.8935943466	<.0001
d_DXCCSR_DIG004	Esophageal disorders	1	-0.1510232501	0.0119083668	-12.6821127319	<.0001
d_DXCCSR_DIG025	Other specified and unspecified gastrointestinal disorders	1	-0.3523266689	0.0315453484	-11.1688945119	<.0001
d_DXCCSR_END001	Thyroid disorders	1	-0.1797541597	0.0111882451	-16.0663408614	<.0001
d_DXCCSR_END007	Nutritional deficiencies	1	-0.4436888876	0.0322271397	-13.7675540457	<.0001
d_DXCCSR_END008	Malnutrition	1	0.1327893885	0.0233899694	5.6771937672	<.0001
d_DXCCSR_END009	Obesity	1	-0.2231795808	0.0153662949	-14.5239683176	<.0001
d_DXCCSR_END010	Disorders of lipid metabolism	1	-0.4290289357	0.0122092444	-35.1396794950	<.0001
d_DXCCSR_END011	Fluid and electrolyte disorders	1	0.1073937256	0.0138585453	7.7492783952	<.0001
d_DXCCSR_END016	Other specified and unspecified nutritional and metabolic disorders	1	-0.2166827683	0.0186572405	-11.6138701458	<.0001
d_DXCCSR_EYE010	Blindness and vision defects	1	-0.4271772083	0.0209624961	-20.3781651502	<.0001
d_DXCCSR_FAC009	Implant, device or graft related encounter	1	-0.2208496562	0.0155228034	-14.2274337383	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_FAC022	Acquired absence of limb or organ	1	-0.2241416516	0.0174388430	-12.8530116467	<.0001
d_DXCCSR_GEN002	Acute and unspecified renal failure	1	0.1180113915	0.0153947051	7.6657130275	<.0001
d_DXCCSR_GEN003	Chronic kidney disease	1	0.1047955347	0.0134662601	7.7820816052	<.0001
d_DXCCSR_GEN004	Urinary tract infections	1	-0.4615515432	0.0154880405	-29.8005123220	<.0001
d_DXCCSR_GEN012	Hyperplasia of prostate	1	-0.2393062274	0.0166121503	-14.4054937823	<.0001
d_DXCCSR_INF002	Septicemia	1	0.3329402488	0.0261521870	12.7308759544	<.0001
d_DXCCSR_MAL001	Cardiac and circulatory congenital anomalies	1	-0.5506783454	0.0266682703	-20.6491961790	<.0001
d_DXCCSR_MBD002	Depressive disorders	1	-0.2150557565	0.0144754921	-14.8565420516	<.0001
d_DXCCSR_MBD005	Anxiety and fear-related disorders	1	-0.0979673614	0.0200842241	-4.8778265390	<.0001
d_DXCCSR_MBD024	Tobacco-related disorders	1	-0.3232373624	0.0174619099	-18.5109970835	<.0001
d_DXCCSR_MUS006	Osteoarthritis	1	-0.1680247561	0.0186362740	-9.0160058981	<.0001
d_DXCCSR_MUS010	Musculoskeletal pain, not low back pain	1	-0.4262511611	0.0320416933	-13.3030160965	<.0001
d_DXCCSR_MUS011	Spondylopathies/spondyloarthropathy (including infective)	1	-0.3666476867	0.0252618312	-14.5138998225	<.0001
d_DXCCSR_NEO070	Secondary malignancies	1	0.8061988198	0.0260955403	30.8941225137	<.0001
d_DXCCSR_NEO073	Benign neoplasms	1	-0.6665410428	0.0387223610	-17.2133368176	<.0001
d_DXCCSR_NVS008	Paralysis (other than cerebral palsy)	1	0.4071047709	0.0147478564	27.6043351771	<.0001
d_DXCCSR_NVS010	Headache; including migraine	1	-0.7339132961	0.0298371741	-24.5972790121	<.0001
d_DXCCSR_NVS011	Neurocognitive disorders	1	-0.3031233872	0.0132431750	-22.8890268146	<.0001
d_DXCCSR_NVS013	Coma; stupor; and brain damage	1	1.5497578594	0.0287531731	53.8986725395	<.0001
d_DXCCSR_NVS016	Sleep wake disorders	1	-0.2685554076	0.0156762354	-17.1313712394	<.0001
d_DXCCSR_NVS019	Nervous system pain and pain syndromes	1	-0.1539534169	0.0202447180	-7.6046214480	<.0001
d_DXCCSR_NVS020	Other nervous system disorders (neither hereditary nor degenerative)	1	0.9026579463	0.0144207512	62.5943774582	<.0001
d_DXCCSR_RSP002	Pneumonia (except that caused by tuberculosis)	1	0.1454452249	0.0250971055	5.7952987890	<.0001
d_DXCCSR_RSP010	Aspiration pneumonitis	1	0.4421938530	0.0251448868	17.5858358890	<.0001
d_DXCCSR_RSP012	Respiratory failure; insufficiency; arrest	1	1.6332451022	0.0188693955	86.5552422674	<.0001
d_DXCCSR_SYM003	Shock	1	1.0297718325	0.0305922482	33.6612015658	<.0001
d_DXCCSR_SYM005	Dysphagia	1	-0.1481180310	0.0235888254	-6.2791609458	<.0001
d_DXCCSR_SYM007	Malaise and fatigue	1	-0.4219646312	0.0370714806	-11.3824596415	<.0001
d_DXCCSR_SYM010	Nervous system signs and symptoms	1	0.1040723523	0.0126129951	8.2512005918	<.0001
d_DXCCSR_SYM011	Genitourinary signs and symptoms	1	-0.5048622305	0.0278603636	-18.1211644766	<.0001
d_DXCCSR_SYM013	Respiratory signs and symptoms	1	0.4805104629	0.0299657137	16.0353418258	<.0001
d_DXCCSR_SYM014	Skin/Subcutaneous signs and symptoms	1	-0.9839825111	0.0408763400	-24.0721774990	<.0001
d_DXCCSR_SYM017	Abnormal findings without diagnosis	1	-0.0494007563	0.0157244349	-3.1416554368	0.0017
TRNSFER	TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	0.5285409621	0.0258400841	20.4543049964	<.0001
DNR	Do not resuscitate flag	1	1.0122295017	0.0221341686	45.7315348132	<.0001
COVIDDX_Q1	COVID, Quarter 1, 2020	1	1.2868379680	0.3408763126	3.7750876796	0.0002
COVIDDX_Q2	COVID, Quarter 2, 2020	1	0.7327444623	0.0917491160	7.9863926133	<.0001
COVIDDX_Q3	COVID, Quarter 3, 2020	1	0.3573920596	0.0886662579	4.0307560988	<.0001
COVIDDX_Q4	COVID, Quarter 4, 2020	1	0.4080718016	0.0598214402	6.8214974423	<.0001
COVIDDX_Q5	COVID, Quarter 1, 2021	1	0.4064362342	0.0528870211	7.6849901089	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
COVIDDX_Q6	COVID, Quarter 2, 2021	1	0.3449237067	0.0847737729	4.0687549356	<.0001
COVIDDX_Q7	COVID, Quarter 3, 2021	1	0.6201921457	0.0654552252	9.4750593764	<.0001
COVIDDX_Q8	COVID, Quarter 4, 2021	1	0.4796926856	0.0646448599	7.4204304257	<.0001
YEAR_2019	Discharge YEAR is 2019 or before 2019	1	-0.0383652930	0.0176132920	-2.1782011583	0.0294
Q1	Quarter 1, 2020	1	-0.0195451929	0.0198934846	-0.9824921688	0.3259
Q2	Quarter 2, 2020	1	-0.0607190079	0.0213799037	-2.8400038007	0.0045
Q3	Quarter 3, 2020	1	-0.0716368250	0.0203946672	-3.5125272825	0.0004
Q4	Quarter 4, 2020	1	-0.0459425002	0.0205480788	-2.2358538128	0.0254
Q5	Quarter 1, 2021	1	-0.0386615093	0.0191197577	-2.0220710867	0.0432
Q6	Quarter 2, 2021	1	-0.1356770973	0.0197572680	-6.8671992996	<.0001
Q7	Quarter 3, 2021	1	-0.0789127600	0.0189569713	-4.1627303686	<.0001
IQ17s0	IQ17 Subarachnoid Hemorrhage Diagnosis Stratum	1	1.6727025139	0.1496602541	11.1766649326	<.0001
IQ17s0_DNR	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Do not resuscitate flag	1	0.4418422175	0.0503918924	8.7681211521	<.0001
IQ17s0_TRNSFER	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	-0.7498031508	0.0372373705	-20.1357706449	<.0001
IQ17s0_d_DXCCSR_CIR007	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Essential hypertension	1	0.0762099809	0.0299818493	2.5418705889	0.0110
IQ17s0_d_DXCCSR_CIR009	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Acute myocardial infarction	1	-0.3025310133	0.0700732603	-4.3173531833	<.0001
IQ17s0_d_DXCCSR_CIR017	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Cardiac dysrhythmias	1	-0.0536464077	0.0373407102	-1.4366734710	0.1508
IQ17s0_d_DXCCSR_CIR019	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Heart failure	1	-0.0912865556	0.0514603757	-1.7739193397	0.0761
IQ17s0_d_DXCCSR_CIR021	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Acute hemorrhagic cerebrovascular disease	1	-0.6875936145	0.1417095986	-4.8521315507	<.0001
IQ17s0_d_DXCCSR_END008	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Malnutrition	1	-0.6540293665	0.0679697667	-9.6223570889	<.0001
IQ17s0_d_DXCCSR_END010	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Disorders of lipid metabolism	1	0.2366280756	0.0298096692	7.9379638232	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
IQ17s0_d_DXCCSR_END011	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Fluid and electrolyte disorders	1	-0.1318665413	0.0313249451	-4.2096335916	<.0001
IQ17s0_d_DXCCSR_FAC009	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Implant, device or graft related encounter	1	0.2681411704	0.0376163420	7.1283159517	<.0001
IQ17s0_d_DXCCSR_GEN002	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Acute and unspecified renal failure	1	0.1458094036	0.0467072743	3.1217707691	0.0018
IQ17s0_d_DXCCSR_MBD024	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Tobacco-related disorders	1	0.1936845379	0.0348032530	5.5651274255	<.0001
IQ17s0_d_DXCCSR_NEO070	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Secondary malignancies	1	-0.7996684763	0.1069632780	-7.4761029323	<.0001
IQ17s0_d_DXCCSR_NVS008	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Paralysis (other than cerebral palsy)	1	-0.6093424004	0.0415874864	-14.6520613112	<.0001
IQ17s0_d_DXCCSR_NVS020	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Other nervous system disorders (neither hereditary nor degenerative)	1	-0.0379764765	0.0337804944	-1.1242131642	0.2609
IQ17s0_d_DXCCSR_RSP002	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Pneumonia (except that caused by tuberculosis)	1	-0.5297816000	0.0674437461	-7.8551627143	<.0001
IQ17s0_d_DXCCSR_RSP010	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Aspiration pneumonitis	1	-0.4344678306	0.0611660805	-7.1030843719	<.0001
IQ17s0_d_DXCCSR_RSP012	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Respiratory failure; insufficiency; arrest	1	-0.0634254308	0.0328311774	-1.9318658626	0.0534
IQ17s0_d_DXCCSR_SYM005	Interaction between IQ17 Subarachnoid Hemorrhage Diagnosis Stratum and Dysphagia	1	-0.8942841560	0.0708190959	-12.6277262550	<.0001
IQ17s1	IQ17 Interacerebral Hemorrhage Diagnosis Stratum	1	1.8491042533	0.1188463352	15.5587822736	<.0001
IQ17s1_DNR	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Do not resuscitate flag	1	0.2813126443	0.0229133525	12.2772363730	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
IQ17s1_TRNSFER	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	-0.6763880957	0.0253999568	-26.6294978614	<.0001
IQ17s1_d_DXCCSR_CIR007	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Essential hypertension	1	0.0708959291	0.0183767001	3.8579249011	0.0001
IQ17s1_d_DXCCSR_CIR009	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Acute myocardial infarction	1	-0.3526193959	0.0474571034	-7.4302764087	<.0001
IQ17s1_d_DXCCSR_CIR017	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Cardiac dysrhythmias	1	-0.1739626087	0.0190543536	-9.1298089918	<.0001
IQ17s1_d_DXCCSR_CIR019	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Heart failure	1	-0.1654475428	0.0248459698	-6.6589287501	<.0001
IQ17s1_d_DXCCSR_CIR021	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Acute hemorrhagic cerebrovascular disease	1	-0.8166389835	0.1184220419	-6.8960049191	<.0001
IQ17s1_d_DXCCSR_END008	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Malnutrition	1	-0.6414960525	0.0374026170	-17.1511007356	<.0001
IQ17s1_d_DXCCSR_END010	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Disorders of lipid metabolism	1	0.1765269156	0.0168665201	10.4661135837	<.0001
IQ17s1_d_DXCCSR_END011	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Fluid and electrolyte disorders	1	-0.2033498168	0.0191123179	-10.6397255464	<.0001
IQ17s1_d_DXCCSR_FAC009	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Implant, device or graft related encounter	1	0.1171850869	0.0203502369	5.7584139016	<.0001
IQ17s1_d_DXCCSR_GEN002	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Acute and unspecified renal failure	1	-0.1321851325	0.0228933279	-5.7739588173	<.0001
IQ17s1_d_DXCCSR_MBD024	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Tobacco-related disorders	1	0.2233987104	0.0248250727	8.9989146344	<.0001
IQ17s1_d_DXCCSR_NEO070	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Secondary malignancies	1	-0.8314236910	0.0424722168	-19.5757074635	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
IQ17s1_d_DXCCSR_NVS008	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Paralysis (other than cerebral palsy)	1	-0.5961269897	0.0197345412	-30.2072890289	<.0001
IQ17s1_d_DXCCSR_NVS020	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Other nervous system disorders (neither hereditary nor degenerative)	1	-0.1843531217	0.0214076273	-8.6115625450	<.0001
IQ17s1_d_DXCCSR_RSP002	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Pneumonia (except that caused by tuberculosis)	1	-0.5020547842	0.0404853461	-12.4009013638	<.0001
IQ17s1_d_DXCCSR_RSP010	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Aspiration pneumonitis	1	-0.4056194925	0.0359604300	-11.2796062978	<.0001
IQ17s1_d_DXCCSR_RSP012	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Respiratory failure; insufficiency; arrest	1	0.3499273791	0.0232148676	15.0734169683	<.0001
IQ17s1_d_DXCCSR_SYM005	Interaction between IQ17 Interacerebral Hemorrhage Diagnosis Stratum and Dysphagia	1	-0.8893781071	0.0341109230	-26.0731176361	<.0001
Intercept	Intercept	1	-3.873535356	0.0369138824	-104.9343796976	<.0001

c-statistic=0.888

C-statistics for hospital level indicators are based on the test data (a random sample of 2019-2021 HCUP reference population, not used for the HGLR feature selection).
C-statistics for area level indicators are based on the full reference population data (2021 HCUP reference population).

Table 8. Risk Adjustment Coefficients for IQI 18 - Gastrointestinal Hemorrhage Mortality Rate

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
Age_LT30	Age < 30	1	-1.614843484	0.0774959703	-20.8377735959	<.0001
Age_30_34	30 <= Age <= 34	1	-0.8908090344	0.0546073955	-16.3129742086	<.0001
Age_35_39	35 <= Age <= 39	1	-0.7194664194	0.0466367683	-15.4270213408	<.0001
Age_40_44	40 <= Age <= 44	1	-0.6048850660	0.0419238514	-14.4281845576	<.0001
Age_45_49	45 <= Age <= 49	1	-0.4473876528	0.0360093913	-12.4241936951	<.0001
Age_50_54	50 <= Age <= 54	1	-0.3943492414	0.0319442921	-12.3449046843	<.0001
Age_55_59	55 <= Age <= 59	1	-0.2402531428	0.0291948050	-8.2293114328	<.0001
Age_60_64	60 <= Age <= 64	1	-0.1129773015	0.0258241437	-4.3748711556	<.0001
Age_70_74	70 <= Age <= 74	1	0.0956554073	0.0250004816	3.8261425789	0.0001
Age_75_79	75 <= Age <= 79	1	0.2606307265	0.0335222304	7.7748623320	<.0001
Age_80_84	80 <= Age <= 84	1	0.2948088340	0.0337641293	8.7314211910	<.0001
Age_85_89	85 <= Age <= 89	1	0.4334036923	0.0337965208	12.8239144674	<.0001
Age_90Plus	Age >= 90	1	0.4454960636	0.0354611645	12.5629282192	<.0001
MALE	Patient Sex Flag: 1=Male / 0=Female	1	0.0536905379	0.0173100318	3.1017007150	0.0019
Age_75_79_MALE	75 <= Age <= 79 MALE	1	0.0414601816	0.0375544182	1.1040027669	0.2696
Age_80_84_MALE	80 <= Age <= 84 MALE	1	0.1368113779	0.0394487424	3.4680795789	0.0005
Age_85_89_MALE	85 <= Age <= 89 MALE	1	0.1280390801	0.0396878921	3.2261496709	0.0013
Age_90Plus_MALE	Occlusion or stenosis of precerebral or cerebral arteries without infarction	1	0.2294158835	0.0436532380	5.2554150423	<.0001
d_DXCCSR_BLD001	Nutritional anemia	1	-0.4949177129	0.0207888377	-23.8068968029	<.0001
d_DXCCSR_BLD003	Aplastic anemia	1	-0.1894204368	0.0165982486	-11.4120737574	<.0001
d_DXCCSR_BLD004	Acute posthemorrhagic anemia	1	-0.2821317783	0.0156682928	-18.0065423826	<.0001
d_DXCCSR_BLD006	Coagulation and hemorrhagic disorders	1	0.3823460979	0.0160694057	23.7934186293	<.0001
d_DXCCSR_CIR003	Nonrheumatic and unspecified valve disorders	1	-0.0939997876	0.0253404085	-3.7094819332	0.0002
d_DXCCSR_CIR005	Myocarditis and cardiomyopathy	1	0.1917030610	0.0243724029	7.8655790268	<.0001
d_DXCCSR_CIR007	Essential hypertension	1	-0.1847509351	0.0173999754	-10.6178848294	<.0001
d_DXCCSR_CIR008	Hypertension with complications and secondary hypertension	1	-0.1993838332	0.0210316529	-9.4801789570	<.0001
d_DXCCSR_CIR009	Acute myocardial infarction	1	0.1804347907	0.0303655342	5.9420917620	<.0001
d_DXCCSR_CIR011	Coronary atherosclerosis and other heart disease	1	0.0489501936	0.0163332458	2.9969666876	0.0027
d_DXCCSR_CIR014	Pulmonary heart disease	1	0.0722936182	0.0264479180	2.7334332411	0.0063
d_DXCCSR_CIR017	Cardiac dysrhythmias	1	0.0340889639	0.0150630977	2.2630779207	0.0236
d_DXCCSR_CIR018	Cardiac arrest and ventricular fibrillation	1	2.8463950482	0.0515960086	55.1669620961	<.0001
d_DXCCSR_CIR019	Heart failure	1	0.3290489747	0.0190460803	17.2764668605	<.0001
d_DXCCSR_CIR031	Hypotension	1	0.1714790651	0.0186272831	9.2058011957	<.0001
d_DXCCSR_CIR032	Other specified and unspecified circulatory disease	1	0.2130669040	0.0299638462	7.1107995390	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_CIR033	Acute phlebitis; thrombophlebitis and thromboembolism	1	0.0918765539	0.0310725147	2.9568432011	0.0031
d_DXCCSR_CIR039	Other specified diseases of veins and lymphatics	1	0.1161311248	0.0216065603	5.3748085365	<.0001
d_DXCCSR_DIG004	Esophageal disorders	1	-0.2731119232	0.0139493479	-19.5788307930	<.0001
d_DXCCSR_DIG005	Gastroduodenal ulcer	1	-0.3634590811	0.0346962417	-10.4754596728	<.0001
d_DXCCSR_DIG007	Gastritis and duodenitis	1	-0.5383072819	0.0193535700	-27.8143661118	<.0001
d_DXCCSR_DIG008	Other specified and unspecified disorders of stomach and duodenum	1	-0.5953165888	0.0188425916	-31.5941989919	<.0001
d_DXCCSR_DIG010	Abdominal hernia	1	-0.4734383113	0.0201165298	-23.5347903009	<.0001
d_DXCCSR_DIG012	Intestinal obstruction and ileus	1	0.4737389152	0.0347551012	13.6307735918	<.0001
d_DXCCSR_DIG013	Diverticulosis and diverticulitis	1	-0.6330245969	0.0204768496	-30.9141596512	<.0001
d_DXCCSR_DIG014	Hemorrhoids	1	-0.6920695913	0.0287802579	-24.0466778491	<.0001
d_DXCCSR_DIG016	Peritonitis and intra-abdominal abscess	1	0.7720350817	0.0452230108	17.0717311422	<.0001
d_DXCCSR_DIG018	Hepatic failure	1	0.9191555971	0.0214350386	42.8809862717	<.0001
d_DXCCSR_DIG019	Other specified and unspecified liver disease	1	0.3521612905	0.0210585342	16.7229726253	<.0001
d_DXCCSR_DIG021	Gastrointestinal hemorrhage	1	-0.6648918097	0.0851750052	-7.8061845516	<.0001
d_DXCCSR_DIG023	Noninfectious hepatitis	1	-0.2214568656	0.0408963209	-5.4150803917	<.0001
d_DXCCSR_DIG025	Other specified and unspecified gastrointestinal disorders	1	-0.0673795483	0.0191634916	-3.5160371447	0.0004
d_DXCCSR_END001	Thyroid disorders	1	-0.1150943424	0.0178592711	-6.4445151139	<.0001
d_DXCCSR_END003	Diabetes mellitus with complication	1	-0.0708707306	0.0256179500	-2.7664481551	0.0057
d_DXCCSR_END005	Diabetes mellitus, Type 2	1	-0.1067717204	0.0220952407	-4.8323402242	<.0001
d_DXCCSR_END008	Malnutrition	1	0.2514840947	0.0178269163	14.1069880070	<.0001
d_DXCCSR_END009	Obesity	1	-0.0387131039	0.0197030404	-1.9648289346	0.0494
d_DXCCSR_END010	Disorders of lipid metabolism	1	-0.2229308673	0.0137756750	-16.1829360390	<.0001
d_DXCCSR_END011	Fluid and electrolyte disorders	1	0.3809884785	0.0139786097	27.2551052233	<.0001
d_DXCCSR_END015	Other specified and unspecified endocrine disorders	1	0.4724342450	0.0346903188	13.6186192927	<.0001
d_DXCCSR_END016	Other specified and unspecified nutritional and metabolic disorders	1	-0.1310952913	0.0189884101	-6.9039635416	<.0001
d_DXCCSR_FAC009	Implant, device or graft related encounter	1	-0.3330250516	0.0171817255	-19.3825149373	<.0001
d_DXCCSR_FAC022	Acquired absence of limb or organ	1	-0.2782101680	0.0220371455	-12.6246009690	<.0001
d_DXCCSR_GEN002	Acute and unspecified renal failure	1	0.4414516496	0.0144299578	30.5927193806	<.0001
d_DXCCSR_GEN003	Chronic kidney disease	1	0.2154781183	0.0192145028	11.2143478291	<.0001
d_DXCCSR_GEN004	Urinary tract infections	1	-0.0811635968	0.0238379824	-3.4048014337	0.0007
d_DXCCSR_GEN012	Hyperplasia of prostate	1	-0.2688868753	0.0245270193	-10.9628843315	<.0001
d_DXCCSR_INF002	Septicemia	1	0.9549572320	0.0425323768	22.4524774895	<.0001
d_DXCCSR_INF003	Bacterial infections	1	-0.2834081205	0.0281276892	-10.0757697828	<.0001
d_DXCCSR_INF007	Hepatitis	1	0.1008917228	0.0223051761	4.5232426022	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_INJ028	Adverse effects of drugs and medicaments, initial encounter	1	-0.4347444440	0.0264046661	-16.4646824960	<.0001
d_DXCCSR_MBD002	Depressive disorders	1	-0.1804850730	0.0216721339	-8.3279788504	<.0001
d_DXCCSR_MBD005	Anxiety and fear-related disorders	1	-0.0966954537	0.0215993995	-4.4767658391	<.0001
d_DXCCSR_MBD017	Alcohol-related disorders	1	0.1528646174	0.0193241500	7.9105480668	<.0001
d_DXCCSR_MBD024	Tobacco-related disorders	1	-0.1423243773	0.0183155013	-7.7707060642	<.0001
d_DXCCSR_MUS006	Osteoarthritis	1	-0.1032972166	0.0246417996	-4.1919510069	<.0001
d_DXCCSR_MUS033	Gout	1	-0.2686887376	0.0326840104	-8.2208007510	<.0001
d_DXCCSR_NEO017	Gastrointestinal cancers - liver	1	0.2851085097	0.0406160787	7.0195971328	<.0001
d_DXCCSR_NEO070	Secondary malignancies	1	0.8142270674	0.0260230462	31.2886915572	<.0001
d_DXCCSR_NEO073	Benign neoplasms	1	-0.5230702831	0.0317103787	-16.4952392161	<.0001
d_DXCCSR_NEO074	Conditions due to neoplasm or the treatment of neoplasm	1	0.3894420774	0.0419100964	9.2923212094	<.0001
d_DXCCSR_NVS009	Epilepsy; convulsions	1	-0.0951709738	0.0321885556	-2.9566711560	0.0031
d_DXCCSR_NVS011	Neurocognitive disorders	1	0.0664577421	0.0199868824	3.3250679554	0.0009
d_DXCCSR_NVS013	Coma; stupor; and brain damage	1	1.0469281866	0.0577333891	18.1338425294	<.0001
d_DXCCSR_NVS015	Polyneuropathies	1	-0.0878290234	0.0298787065	-2.9395189359	0.0033
d_DXCCSR_NVS016	Sleep wake disorders	1	-0.2265003954	0.0236200773	-9.5893164328	<.0001
d_DXCCSR_NVS019	Nervous system pain and pain syndromes	1	-0.2413406745	0.0251737348	-9.5870031370	<.0001
d_DXCCSR_NVS020	Other nervous system disorders (neither hereditary nor degenerative)	1	0.4043023170	0.0190683100	21.2028395305	<.0001
d_DXCCSR_RSP002	Pneumonia (except that caused by tuberculosis)	1	0.3761490990	0.0275035674	13.6763749020	<.0001
d_DXCCSR_RSP010	Aspiration pneumonitis	1	0.2474061586	0.0390295065	6.3389517485	<.0001
d_DXCCSR_RSP011	Pleurisy, pleural effusion and pulmonary collapse	1	0.3678339227	0.0252571425	14.5635604948	<.0001
d_DXCCSR_RSP012	Respiratory failure; insufficiency; arrest	1	0.6514701416	0.0179403050	36.3132143090	<.0001
d_DXCCSR_RSP016	Other specified and unspecified lower respiratory disease	1	0.4164586373	0.0360975867	11.5370215935	<.0001
d_DXCCSR_SKN003	Pressure ulcer of skin	1	0.2664505893	0.0283182734	9.4091396599	<.0001
d_DXCCSR_SYM003	Shock	1	1.1904776285	0.0188034895	63.3115267522	<.0001
d_DXCCSR_SYM005	Dysphagia	1	-0.1593464184	0.0362247179	-4.3988311719	<.0001
d_DXCCSR_SYM006	Abdominal pain and other digestive/abdomen signs and symptoms	1	0.1153007231	0.0198937100	5.7958381390	<.0001
d_DXCCSR_SYM010	Nervous system signs and symptoms	1	0.1940346120	0.0300835999	6.4498468561	<.0001
d_DXCCSR_SYM011	Genitourinary signs and symptoms	1	-0.2057267089	0.0360985193	-5.6990345479	<.0001
d_DXCCSR_SYM016	Other general signs and symptoms	1	0.2632031446	0.0196845031	13.3710839959	<.0001
d_DXCCSR_SYM017	Abnormal findings without diagnosis	1	-0.1166407109	0.0200521825	-5.8168586285	<.0001
TRNSFER	TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	0.3058109783	0.0222975066	13.7150302697	<.0001
DNR	Do not resuscitate flag	1	0.8328722360	0.0192379983	43.2930818471	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
COVIDDX_Q1	COVID, Quarter 1, 2020	1	1.5487800007	0.3426646968	4.5198119772	<.0001
COVIDDX_Q2	COVID, Quarter 2, 2020	1	0.4384234683	0.1275911119	3.4361599484	0.0006
COVIDDX_Q3	COVID, Quarter 3, 2020	1	0.3192889528	0.1214434567	2.6291161458	0.0086
COVIDDX_Q4	COVID, Quarter 4, 2020	1	0.5339531675	0.0823782724	6.4817233006	<.0001
COVIDDX_Q5	COVID, Quarter 1, 2021	1	0.5274120827	0.0747733933	7.0534726289	<.0001
COVIDDX_Q6	COVID, Quarter 2, 2021	1	0.5348861146	0.1409072987	3.7960142554	0.0001
COVIDDX_Q7	COVID, Quarter 3, 2021	1	0.3892550743	0.1113643468	3.4953293882	0.0005
COVIDDX_Q8	COVID, Quarter 4, 2021	1	0.5165283361	0.0925529870	5.5808932009	<.0001
YEAR_2019	Discharge YEAR is 2019 or before 2019	1	-0.1859255114	0.0237484709	-7.8289466456	<.0001
Q1	Quarter 1, 2020	1	-0.1414918987	0.0290545519	-4.8698702740	<.0001
Q2	Quarter 2, 2020	1	-0.1586069091	0.0298288821	-5.3172260506	<.0001
Q3	Quarter 3, 2020	1	-0.1543509860	0.0288260933	-5.3545579140	<.0001
Q4	Quarter 4, 2020	1	-0.0999066192	0.0290099037	-3.4438797278	0.0006
Q5	Quarter 1, 2021	1	-0.0766526250	0.0287234084	-2.6686465555	0.0076
Q6	Quarter 2, 2021	1	-0.2200969107	0.0285819402	-7.7005587775	<.0001
Q7	Quarter 3, 2021	1	-0.1093013883	0.0283982702	-3.8488748581	0.0001
Intercept	Intercept	1	-3.129830070	0.0935176903	-33.4677862682	<.0001

c-statistic=0.882

C-statistics for hospital level indicators are based on the test data (a random sample of 2019-2021 HCUP reference population, not used for the LASSO feature selection).
C-statistics for area level indicators are based on the full reference population data (2021 HCUP reference population).

Table 9. Risk Adjustment Coefficients for IQI 19 - Hip Fracture Mortality Rate

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
Age_70_74	70 <= Age <= 74	1	0.1409063452	0.0492634259	2.8602628127	0.0042
Age_75_79	75 <= Age <= 79	1	0.3451675632	0.0463292932	7.4503092755	<.0001
Age_80_84	80 <= Age <= 84	1	0.4077739038	0.0507623769	8.0329946895	<.0001
Age_85_89	85 <= Age <= 89	1	0.5475612382	0.0509263827	10.7520151535	<.0001
Age_90Plus	Age >= 90	1	0.8692655036	0.0487974532	17.8137473781	<.0001
MALE	Patient Sex Flag: 1=Male / 0=Female	1	0.4169253313	0.0343402978	12.1409934587	<.0001
Age_80_84_MALE	80 <= Age <= 84 MALE	1	0.0615490952	0.0513407262	1.1988356948	0.2306
Age_85_89_MALE	85 <= Age <= 89 MALE	1	0.1185294745	0.0484729761	2.4452691798	0.0145
Age_90Plus_MALE	Age >= 90 MALE	1	0.0234444130	0.0448664315	0.5225379468	0.6013
MDC_8	Diseases and disorders of the musculoskeletal system and connective tissue	1	-0.6961668265	0.0465638310	-14.9508064805	<.0001
d_DXCCSR_BLD001	Nutritional anemia	1	-0.1706510671	0.0338101537	-5.0473318892	<.0001
d_DXCCSR_BLD003	Aplastic anemia	1	0.0917341542	0.0210784254	4.3520401839	<.0001
d_DXCCSR_BLD004	Acute posthemorrhagic anemia	1	-0.2525789085	0.0371529154	-6.7983603914	<.0001
d_DXCCSR_BLD006	Coagulation and hemorrhagic disorders	1	0.1639804503	0.0286492870	5.7237183638	<.0001
d_DXCCSR_BLD007	Diseases of white blood cells	1	-0.2574935161	0.0365972841	-7.0358640586	<.0001
d_DXCCSR_CIR001	Chronic rheumatic heart disease	1	0.0893914699	0.0366606647	2.4383483107	0.0148
d_DXCCSR_CIR005	Myocarditis and cardiomyopathy	1	0.1456318669	0.0305360802	4.7691735718	<.0001
d_DXCCSR_CIR007	Occlusion or stenosis of precerebral or cerebral arteries without infarction	1	-0.2487325833	0.0244963416	-10.1538665214	<.0001
d_DXCCSR_CIR009	Acute myocardial infarction	1	0.6442990794	0.0496986630	12.9641129303	<.0001
d_DXCCSR_CIR011	Coronary atherosclerosis and other heart disease	1	0.2788874576	0.0203771927	13.6862551168	<.0001
d_DXCCSR_CIR014	Pulmonary heart disease	1	0.2975349261	0.0302273168	9.8432463441	<.0001
d_DXCCSR_CIR017	Cardiac dysrhythmias	1	0.3079799895	0.0191907580	16.0483493544	<.0001
d_DXCCSR_CIR019	Heart failure	1	0.5567524216	0.0236461008	23.5452105278	<.0001
d_DXCCSR_CIR026	Peripheral and visceral vascular disease	1	0.1364627020	0.0315627587	4.3235353229	<.0001
d_DXCCSR_CIR031	Hypotension	1	0.2721575435	0.0374447893	7.2682354102	<.0001
d_DXCCSR_CIR032	Other specified and unspecified circulatory disease	1	0.1447180842	0.0436447102	3.3158218589	0.0009
d_DXCCSR_DIG004	Esophageal disorders	1	-0.0847412304	0.0204694779	-4.1398823509	<.0001
d_DXCCSR_DIG019	Other specified and unspecified liver disease	1	0.4313010702	0.0489932812	8.8032697510	<.0001
d_DXCCSR_DIG025	Other specified and unspecified gastrointestinal disorders	1	-0.3278217681	0.0370429103	-8.8497843514	<.0001
d_DXCCSR_END003	Diabetes mellitus with complication	1	0.0954185615	0.0252817162	3.7742121844	0.0002
d_DXCCSR_END007	Nutritional deficiencies	1	-0.4147592798	0.0441003189	-9.4049043116	<.0001
d_DXCCSR_END008	Malnutrition	1	0.5413210162	0.0243729006	22.2099546525	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_END009	Obesity	1	-0.1881654980	0.0411369623	-4.5741223373	<.0001
d_DXCCSR_END010	Disorders of lipid metabolism	1	-0.2359275734	0.0182355615	-12.9377740073	<.0001
d_DXCCSR_END011	Fluid and electrolyte disorders	1	0.2735972346	0.0185895296	14.7178138002	<.0001
d_DXCCSR_FAC009	Implant, device or graft related encounter	1	-0.3120384536	0.0208438357	-14.9702990662	<.0001
d_DXCCSR_FAC022	Acquired absence of limb or organ	1	-0.2717577693	0.0300682636	-9.0380267152	<.0001
d_DXCCSR_GEN002	Acute and unspecified renal failure	1	0.2313959647	0.0232878813	9.9363253072	<.0001
d_DXCCSR_GEN003	Chronic kidney disease	1	0.2590623111	0.0227129911	11.4059090770	<.0001
d_DXCCSR_GEN004	Urinary tract infections	1	-0.1378722673	0.0265494577	-5.1930351669	<.0001
d_DXCCSR_GEN012	Hyperplasia of prostate	1	-0.2999369087	0.0315162694	-9.5168912728	<.0001
d_DXCCSR_INJ002	Fracture of the spine and back, initial encounter	1	0.3273723601	0.0491806276	6.6565307528	<.0001
d_DXCCSR_INJ003	Fracture of torso, initial encounter	1	0.0876133259	0.0513128757	1.7074335583	0.0877
d_DXCCSR_INJ004	Fracture of the upper limb, initial encounter	1	0.2820419382	0.0352343863	8.0047353705	<.0001
d_DXCCSR_MBD002	Depressive disorders	1	-0.1756700944	0.0270885551	-6.4850300808	<.0001
d_DXCCSR_MBD005	Anxiety and fear-related disorders	1	-0.0237159064	0.0273818884	-0.8661165375	0.3864
d_DXCCSR_MBD024	Tobacco-related disorders	1	-0.2084666598	0.0363112549	-5.7411031487	<.0001
d_DXCCSR_MUS006	Osteoarthritis	1	-0.2435465767	0.0260601072	-9.3455707733	<.0001
d_DXCCSR_MUS011	Spondylopathies/spondyloarthropathy (including infective)	1	-0.2710405057	0.0431100382	-6.2871785120	<.0001
d_DXCCSR_MUS013	Osteoporosis	1	-0.1718593802	0.0262898889	-6.5370904011	<.0001
d_DXCCSR_MUS028	Other specified bone disease and musculoskeletal deformities	1	-0.2684721048	0.0456553055	-5.8804141522	<.0001
d_DXCCSR_NVS011	Neurocognitive disorders	1	0.0296920932	0.0199704045	1.4868047929	0.1371
d_DXCCSR_NVS015	Polyneuropathies	1	-0.1621430551	0.0409551228	-3.9590420958	<.0001
d_DXCCSR_NVS016	Sleep wake disorders	1	-0.1714672602	0.0315614241	-5.4328112651	<.0001
d_DXCCSR_NVS019	Nervous system pain and pain syndromes	1	-0.1265787287	0.0366345316	-3.4551752984	0.0005
d_DXCCSR_NVS020	Other nervous system disorders (neither hereditary nor degenerative)	1	0.3523729119	0.0317392450	11.1021201700	<.0001
d_DXCCSR_RSP002	Pneumonia (except that caused by tuberculosis)	1	0.5040335888	0.0388968854	12.9581991748	<.0001
d_DXCCSR_RSP008	Chronic obstructive pulmonary disease and bronchiectasis	1	0.2664678451	0.0215939028	12.3399575901	<.0001
d_DXCCSR_RSP011	Pleurisy, pleural effusion and pulmonary collapse	1	0.4811399655	0.0397742534	12.0967692424	<.0001
d_DXCCSR_RSP012	Respiratory failure; insufficiency; arrest	1	0.4773388346	0.0307281241	15.5342653984	<.0001
d_DXCCSR_RSP016	Other specified and unspecified lower respiratory disease	1	0.4903968537	0.0449344591	10.9136031359	<.0001
d_DXCCSR_SKN003	Pressure ulcer of skin	1	0.1394916513	0.0465576313	2.9961071360	0.0027
d_DXCCSR_SYM005	Dysphagia	1	0.2677630685	0.0400212039	6.6905300827	<.0001
d_DXCCSR_SYM011	Genitourinary signs and symptoms	1	-0.4837380562	0.0492030652	-9.8314617970	<.0001
d_DXCCSR_SYM016	Other general signs and symptoms	1	0.3114971357	0.0243233837	12.8064885807	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
TRNSFER	TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	0.1009471220	0.0324530875	3.1105552566	0.0019
DNR	Do not resuscitate flag	1	0.6563203873	0.0226140760	29.0226488334	<.0001
COVIDDX_Q2	COVID, Quarter 2, 2020	1	1.2656551091	0.1450300330	8.7268483816	<.0001
COVIDDX_Q3	COVID, Quarter 3, 2020	1	1.2114481111	0.1468929346	8.2471503129	<.0001
COVIDDX_Q4	COVID, Quarter 4, 2020	1	0.9940806612	0.1013355387	9.8097930288	<.0001
COVIDDX_Q5	COVID, Quarter 1, 2021	1	0.6492656776	0.1083902470	5.9900747127	<.0001
COVIDDX_Q6	COVID, Quarter 2, 2021	1	0.6832698884	0.2189160201	3.1211506958	0.0018
COVIDDX_Q7	COVID, Quarter 3, 2021	1	0.8412734417	0.1695485847	4.9618429038	<.0001
COVIDDX_Q8	COVID, Quarter 4, 2021	1	0.9196422694	0.1340070316	6.8626418957	<.0001
YEAR_2019	Discharge YEAR is 2019 or before 2019	1	-0.0597828335	0.0321265767	-1.8608529006	0.0628
Q1	Quarter 1, 2020	1	-0.1002572520	0.0417432203	-2.4017613235	0.0163
Q2	Quarter 2, 2020	1	-0.0909058054	0.0416844266	-2.1808097849	0.0292
Q3	Quarter 3, 2020	1	-0.1042924085	0.0419238546	-2.4876626797	0.0129
Q4	Quarter 4, 2020	1	0.0239428159	0.0405340610	0.5906838657	0.5547
Q5	Quarter 1, 2021	1	-0.0610249214	0.0411958426	-1.4813368892	0.1385
Q6	Quarter 2, 2021	1	-0.1099579626	0.0398867508	-2.7567540717	0.0058
Q7	Quarter 3, 2021	1	-0.0879358610	0.0417497570	-2.1062604250	0.0352
Intercept	Intercept	1	-4.413930158	0.0708598711	-62.2909707160	<.0001

c-statistic=0.801

C-statistics for hospital level indicators are based on the test data (a random sample of 2019-2021 HCUP reference population, not used for the LASSO feature selection).
C-statistics for area level indicators are based on the full reference population data (2021 HCUP reference population).

Table 10. Risk Adjustment Coefficients for IQI 20 - Pneumonia Mortality Rate

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
Age_LT30	Age < 30	1	-1.421052822	0.0278618193	-51.0035904818	<.0001
Age_30_34	30 <= Age <= 34	1	-1.185301645	0.0424429720	-27.9269237620	<.0001
Age_35_39	35 <= Age <= 39	1	-1.104808286	0.0244671598	-45.1547419616	<.0001
Age_40_44	40 <= Age <= 44	1	-0.8938524665	0.0213526615	-41.8614075372	<.0001
Age_45_49	45 <= Age <= 49	1	-0.6060376259	0.0252057349	-24.0436403699	<.0001
Age_50_54	50 <= Age <= 54	1	-0.4819306554	0.0139675398	-34.5036177388	<.0001
Age_55_59	55 <= Age <= 59	1	-0.2968381537	0.0120770599	-24.5786768954	<.0001
Age_60_64	60 <= Age <= 64	1	-0.1054398509	0.0104452149	-10.0945602144	<.0001
Age_70_74	70 <= Age <= 74	1	0.0826347336	0.0131678508	6.2754913218	<.0001
Age_75_79	75 <= Age <= 79	1	0.1909307146	0.0129647729	14.7268845753	<.0001
Age_80_84	80 <= Age <= 84	1	0.2457799165	0.0138413204	17.7569704531	<.0001
Age_85_89	85 <= Age <= 89	1	0.2989490789	0.0148673262	20.1077904252	<.0001
Age_90Plus	Age >= 90	1	0.4064686548	0.0163210380	24.9045835802	<.0001
MALE	Patient Sex Flag: 1=Male / 0=Female	1	0.0715470334	0.0087716898	8.1565849647	<.0001
Age_30_34_MALE	30 <= Age <= 34 MALE	1	-0.0895474732	0.0524583586	-1.7070201138	0.0878
Age_45_49_MALE	45 <= Age <= 49 MALE	1	-0.0843105365	0.0303150459	-2.7811449368	0.0054
Age_70_74_MALE	70 <= Age <= 74 MALE	1	0.0578052633	0.0155481011	3.7178342906	0.0002
Age_75_79_MALE	Occlusion or stenosis of precerebral or cerebral arteries without infarction	1	0.0439397910	0.0153114503	2.8697340894	0.0041
Age_80_84_MALE	80 <= Age <= 84 MALE	1	0.0822957471	0.0163276419	5.0402714464	<.0001
Age_85_89_MALE	85 <= Age <= 89 MALE	1	0.0937945227	0.0166007278	5.6500247450	<.0001
Age_90Plus_MALE	Age >= 90 MALE	1	0.0611169591	0.0168183655	3.6339416654	0.0003
MDC_4	Diseases and disorders of the respiratory system	1	-0.5401398411	0.0426483893	-12.6649528833	<.0001
MDC_18	Infectious and parasitic diseases, systemic or unspecified sites	1	-0.0698990453	0.0422638289	-1.6538739416	0.0982
d_DXCCSR_BLD001	Nutritional anemia	1	-0.1600564687	0.0109627851	-14.5999823351	<.0001
d_DXCCSR_BLD004	Acute posthemorrhagic anemia	1	0.0756468761	0.0197947541	3.8215618086	0.0001
d_DXCCSR_BLD006	Coagulation and hemorrhagic disorders	1	0.3181528671	0.0113577581	28.0119425671	<.0001
d_DXCCSR_BLD007	Diseases of white blood cells	1	-0.1367972129	0.0155584242	-8.7924850841	<.0001
d_DXCCSR_BLD008	Immunity disorders	1	0.0884516589	0.0191955375	4.6079282218	<.0001
d_DXCCSR_CIR001	Chronic rheumatic heart disease	1	0.0023750483	0.0160342244	0.1481236759	0.8822
d_DXCCSR_CIR004	Endocarditis and endocardial disease	1	0.5020932820	0.0348837876	14.3933132233	<.0001
d_DXCCSR_CIR005	Myocarditis and cardiomyopathy	1	0.0687285477	0.0106717071	6.4402580578	<.0001
d_DXCCSR_CIR006	Pericarditis and pericardial disease	1	0.1373588013	0.0218346157	6.2908733139	<.0001
d_DXCCSR_CIR007	Essential hypertension	1	-0.1655647245	0.0092551656	-17.8888991694	<.0001
d_DXCCSR_CIR008	Hypertension with complications and secondary hypertension	1	-0.1793678066	0.0100529444	-17.8423155848	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_CIR009	Acute myocardial infarction	1	0.3278148212	0.0140684269	23.3014553875	<.0001
d_DXCCSR_CIR011	Coronary atherosclerosis and other heart disease	1	0.0574837565	0.0070123077	8.1975519801	<.0001
d_DXCCSR_CIR013	Acute pulmonary embolism	1	0.2174340328	0.0168060955	12.9378077590	<.0001
d_DXCCSR_CIR014	Pulmonary heart disease	1	0.1139883556	0.0108260155	10.5291143924	<.0001
d_DXCCSR_CIR017	Cardiac dysrhythmias	1	0.1632516867	0.0063217769	25.8237027617	<.0001
d_DXCCSR_CIR018	Cardiac arrest and ventricular fibrillation	1	2.1900700789	0.0281736305	77.7347482896	<.0001
d_DXCCSR_CIR019	Heart failure	1	0.2679908689	0.0083961750	31.9182092118	<.0001
d_DXCCSR_CIR020	Cerebral infarction	1	0.4214007049	0.0248513354	16.9568635894	<.0001
d_DXCCSR_CIR021	Acute hemorrhagic cerebrovascular disease	1	0.4297524005	0.0383394834	11.2091338284	<.0001
d_DXCCSR_CIR026	Peripheral and visceral vascular disease	1	0.0990487315	0.0124681404	7.9441463261	<.0001
d_DXCCSR_CIR028	Gangrene	1	0.3622272426	0.0272707756	13.2826160870	<.0001
d_DXCCSR_CIR029	Aortic; peripheral; and visceral artery aneurysms	1	-0.0651501073	0.0195818523	-3.3270656070	0.0009
d_DXCCSR_CIR030	Aortic and peripheral arterial embolism or thrombosis	1	0.5473930156	0.0434213675	12.6065355985	<.0001
d_DXCCSR_CIR031	Hypotension	1	0.1154648146	0.0123099458	9.3797988065	<.0001
d_DXCCSR_CIR033	Acute phlebitis; thrombophlebitis and thromboembolism	1	0.1656651165	0.0169365973	9.7814876213	<.0001
d_DXCCSR_CIR039	Other specified diseases of veins and lymphatics	1	-0.0180771174	0.0220709299	-0.8190464787	0.4128
d_DXCCSR_DEN003	Caries, periodontitis, and other preventable dental conditions	1	-0.3570863677	0.0272317333	-13.1128769364	<.0001
d_DXCCSR_DIG004	Esophageal disorders	1	-0.1500610943	0.0075498992	-19.8759070113	<.0001
d_DXCCSR_DIG007	Gastritis and duodenitis	1	-0.3222496554	0.0247623623	-13.0136879107	<.0001
d_DXCCSR_DIG010	Abdominal hernia	1	-0.2086417170	0.0163634279	-12.7504895593	<.0001
d_DXCCSR_DIG012	Intestinal obstruction and ileus	1	0.3200322713	0.0184410219	17.3543675304	<.0001
d_DXCCSR_DIG013	Diverticulosis and diverticulitis	1	-0.2265415778	0.0218233303	-10.3807061046	<.0001
d_DXCCSR_DIG016	Peritonitis and intra-abdominal abscess	1	0.3742310633	0.0300117125	12.4695004854	<.0001
d_DXCCSR_DIG018	Hepatic failure	1	1.0120463874	0.0195786483	51.6913309834	<.0001
d_DXCCSR_DIG019	Other specified and unspecified liver disease	1	0.2039919793	0.0120094096	16.9860122566	<.0001
d_DXCCSR_DIG021	Gastrointestinal hemorrhage	1	0.2953842956	0.0166547919	17.7356941375	<.0001
d_DXCCSR_DIG022	Noninfectious gastroenteritis	1	-0.1948482136	0.0229002469	-8.5085638852	<.0001
d_DXCCSR_DIG024	Postprocedural or postoperative digestive system complication	1	-0.2070188313	0.0348427026	-5.9415262181	<.0001
d_DXCCSR_DIG025	Other specified and unspecified gastrointestinal disorders	1	-0.1219381031	0.0111685466	-10.9179920525	<.0001
d_DXCCSR_EAR004	Hearing loss	1	-0.1435654632	0.0163205532	-8.7966051902	<.0001
d_DXCCSR_END001	Thyroid disorders	1	-0.0866107637	0.0071636965	-12.0902334864	<.0001
d_DXCCSR_END002	Diabetes mellitus without complication	1	-0.0978279880	0.0101604273	-9.6283340179	<.0001
d_DXCCSR_END007	Nutritional deficiencies	1	-0.1532499310	0.0169741480	-9.0284314262	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_END008	Malnutrition	1	0.2925982002	0.0105798338	27.6562189952	<.0001
d_DXCCSR_END010	Disorders of lipid metabolism	1	-0.1620145924	0.0069255174	-23.3938611275	<.0001
d_DXCCSR_END011	Fluid and electrolyte disorders	1	0.2330120790	0.0069624211	33.4671053679	<.0001
d_DXCCSR_END015	Other specified and unspecified endocrine disorders	1	0.1753107322	0.0176652501	9.9240447431	<.0001
d_DXCCSR_END016	Other specified and unspecified nutritional and metabolic disorders	1	-0.0619173703	0.0109129226	-5.6737660704	<.0001
d_DXCCSR_EXT017	External cause codes: suffocation/inhalation; initial encounter	1	0.3574619147	0.0286269016	12.4869229730	<.0001
d_DXCCSR_FAC009	Implant, device or graft related encounter	1	-0.2031846005	0.0088592240	-22.9348080035	<.0001
d_DXCCSR_FAC014	Medical examination/evaluation	1	0.1935138608	0.0652523335	2.9656236103	0.0030
d_DXCCSR_FAC015	Resistance to antimicrobial drugs	1	-0.0546977477	0.0204920861	-2.6692132512	0.0076
d_DXCCSR_FAC022	Acquired absence of limb or organ	1	-0.2829412540	0.0119331040	-23.7106165317	<.0001
d_DXCCSR_GEN002	Acute and unspecified renal failure	1	0.4209237176	0.0075167897	55.9978044540	<.0001
d_DXCCSR_GEN003	Chronic kidney disease	1	0.1150219305	0.0080064928	14.3660818690	<.0001
d_DXCCSR_GEN004	Urinary tract infections	1	-0.1071871289	0.0086836956	-12.3434922126	<.0001
d_DXCCSR_GEN005	Calculus of urinary tract	1	-0.2731205737	0.0297667007	-9.1753727335	<.0001
d_DXCCSR_GEN006	Other specified and unspecified diseases of kidney and ureters	1	-0.0504045537	0.0138209378	-3.6469705846	0.0003
d_DXCCSR_GEN007	Other specified and unspecified diseases of bladder and urethra	1	-0.1167046035	0.0220578201	-5.2908493775	<.0001
d_DXCCSR_GEN008	Urinary incontinence	1	-0.2151420058	0.0225812025	-9.5274822376	<.0001
d_DXCCSR_GEN009	Hematuria	1	-0.1338458622	0.0219069929	-6.1097322959	<.0001
d_DXCCSR_GEN012	Hyperplasia of prostate	1	-0.1906316160	0.0100244454	-19.0166745078	<.0001
d_DXCCSR_INF004	Fungal infections	1	0.3039155380	0.0170790115	17.7946795754	<.0001
d_DXCCSR_INF008	Viral infection	1	0.0280307044	0.0142704533	1.9642476482	0.0495
d_DXCCSR_INJ017	Superficial injury; contusion, initial encounter	1	-0.1080774758	0.0264753060	-4.0821993030	<.0001
d_DXCCSR_INJ028	Adverse effects of drugs and medicaments, initial encounter	1	-0.3340468341	0.0144462076	-23.1234968034	<.0001
d_DXCCSR_INJ031	Allergic reactions	1	-0.0908566998	0.0308438723	-2.9456969252	0.0032
d_DXCCSR_INJ033	Complication of cardiovascular device, implant or graft, initial encounter	1	0.1260176589	0.0410053940	3.0731971237	0.0021
d_DXCCSR_INJ034	Complication of genitourinary device, implant or graft, initial encounter	1	-0.1438383349	0.0308987126	-4.6551562393	<.0001
d_DXCCSR_INJ036	Complication of transplanted organs or tissue, initial encounter	1	0.3176222362	0.0326086406	9.7404316953	<.0001
d_DXCCSR_MBD001	Schizophrenia spectrum and other psychotic disorders	1	-0.1164518722	0.0222434389	-5.2353358171	<.0001
d_DXCCSR_MBD002	Depressive disorders	1	-0.1358434805	0.0090221040	-15.0567407079	<.0001
d_DXCCSR_MBD003	Bipolar and related disorders	1	-0.2004296983	0.0195486585	-10.2528620270	<.0001
d_DXCCSR_MBD005	Anxiety and fear-related disorders	1	0.1007233056	0.0091692267	10.9849291806	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_MBD007	Trauma- and stressor-related disorders	1	-0.1518476703	0.0264584682	-5.7390952949	<.0001
d_DXCCSR_MBD017	Alcohol-related disorders	1	0.0671212323	0.0146737837	4.5742280128	<.0001
d_DXCCSR_MBD018	Opioid-related disorders	1	-0.1871035212	0.0218173003	-8.5759245595	<.0001
d_DXCCSR_MBD019	Cannabis-related disorders	1	-0.3005818273	0.0331124081	-9.0776190743	<.0001
d_DXCCSR_MBD021	Stimulant-related disorders	1	-0.3234540578	0.0296853099	-10.8960983976	<.0001
d_DXCCSR_MBD024	Tobacco-related disorders	1	-0.3083074525	0.0110427373	-27.9194771460	<.0001
d_DXCCSR_MUS006	Osteoarthritis	1	-0.0867327851	0.0112193077	-7.7306717309	<.0001
d_DXCCSR_MUS010	Musculoskeletal pain, not low back pain	1	-0.2385517713	0.0177335652	-13.4519916600	<.0001
d_DXCCSR_MUS011	Spondylopathies/spondyloarthropathy (including infective)	1	-0.1308849859	0.0168529075	-7.7663148420	<.0001
d_DXCCSR_MUS013	Osteoporosis	1	-0.0434267920	0.0141906108	-3.0602482516	0.0022
d_DXCCSR_MUS022	Scoliosis and other postural dorsopathic deformities	1	0.1671128450	0.0275031144	6.0761425899	<.0001
d_DXCCSR_MUS025	Other specified connective tissue disease	1	-0.1007176007	0.0213587550	-4.7155183305	<.0001
d_DXCCSR_MUS026	Muscle disorders	1	0.0520033220	0.0172714563	3.0109401952	0.0026
d_DXCCSR_MUS028	Other specified bone disease and musculoskeletal deformities	1	-0.2016855647	0.0278563473	-7.2402014026	<.0001
d_DXCCSR_MUS033	Gout	1	-0.1604934633	0.0141123088	-11.3725872366	<.0001
d_DXCCSR_MUS038	Low back pain	1	-0.0867481768	0.0219349615	-3.9547904806	<.0001
d_DXCCSR_NEO012	Gastrointestinal cancers - esophagus	1	0.4674796488	0.0350585785	13.3342442407	<.0001
d_DXCCSR_NEO022	Respiratory cancers	1	0.3785009794	0.0136190071	27.7921126661	<.0001
d_DXCCSR_NEO039	Male reproductive system cancers - prostate	1	-0.2030770470	0.0262731539	-7.7294506703	<.0001
d_DXCCSR_NEO051	Endocrine system cancers - pancreas	1	0.1715862301	0.0382640482	4.4842675628	<.0001
d_DXCCSR_NEO058	Non-Hodgkin lymphoma	1	0.3362473805	0.0223084332	15.0726578395	<.0001
d_DXCCSR_NEO060	Leukemia - acute myeloid leukemia (AML)	1	1.0748227766	0.0371707577	28.9158156631	<.0001
d_DXCCSR_NEO068	Myelodysplastic syndrome (MDS)	1	0.2640649810	0.0301924156	8.7460700257	<.0001
d_DXCCSR_NEO070	Secondary maligancies	1	0.7848763026	0.0128675249	60.9966803044	<.0001
d_DXCCSR_NEO072	Neoplasms of unspecified nature or uncertain behavior	1	-0.2693251764	0.0249504294	-10.7944104563	<.0001
d_DXCCSR_NEO073	Benign neoplasms	1	-0.3488864078	0.0295511925	-11.8061702004	<.0001
d_DXCCSR_NEO074	Conditions due to neoplasm or the treatment of neoplasm	1	0.2988414617	0.0151126223	19.7742956278	<.0001
d_DXCCSR_NVS005	Multiple sclerosis	1	-0.1102062297	0.0349407161	-3.1540919050	0.0016
d_DXCCSR_NVS008	Paralysis (other than cerebral palsy)	1	0.1277155133	0.0203954682	6.2619554573	<.0001
d_DXCCSR_NVS009	Epilepsy; convulsions	1	-0.0642167297	0.0118482468	-5.4199351847	<.0001
d_DXCCSR_NVS010	Headache; including migraine	1	-0.4486392538	0.0302744672	-14.8190635678	<.0001
d_DXCCSR_NVS013	Coma; stupor; and brain damage	1	0.8393045468	0.0238565709	35.1812735084	<.0001
d_DXCCSR_NVS015	Polyneuropathies	1	-0.1224590577	0.0122294296	-10.0134725851	<.0001
d_DXCCSR_NVS016	Sleep wake disorders	1	-0.2071604308	0.0096602017	-21.4447313244	<.0001
d_DXCCSR_NVS018	Myopathies	1	0.2176351075	0.0333508530	6.5256234176	<.0001
d_DXCCSR_NVS019	Nervous system pain and pain syndromes	1	-0.1559449140	0.0120867701	-12.9021163859	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_NVS020	Other nervous system disorders (neither hereditary nor degenerative)	1	0.2193793782	0.0080006414	27.4202239739	<.0001
d_DXCCSR_RSP002	Pneumonia (except that caused by tuberculosis)	1	-0.1476329862	0.0177175551	-8.3325823113	<.0001
d_DXCCSR_RSP003	Influenza	1	-0.1134153476	0.0188502297	-6.0166560024	<.0001
d_DXCCSR_RSP005	Acute bronchitis	1	-0.7576373718	0.0285569043	-26.5307948968	<.0001
d_DXCCSR_RSP007	Other specified and unspecified upper respiratory disease	1	-0.0907545100	0.0279336770	-3.2489281700	0.0012
d_DXCCSR_RSP008	Chronic obstructive pulmonary disease and bronchiectasis	1	-0.1546355225	0.0070750734	-21.8563841901	<.0001
d_DXCCSR_RSP009	Asthma	1	-0.2454285580	0.0124025361	-19.7885783343	<.0001
d_DXCCSR_RSP010	Aspiration pneumonitis	1	0.1979926839	0.0172482920	11.4789733482	<.0001
d_DXCCSR_RSP011	Pleurisy, pleural effusion and pulmonary collapse	1	0.1947537148	0.0094250844	20.6633391048	<.0001
d_DXCCSR_RSP012	Respiratory failure; insufficiency; arrest	1	0.6514675763	0.0096154594	67.7521009544	<.0001
d_DXCCSR_RSP013	Lung disease due to external agents	1	0.3553509537	0.0330771996	10.7430785640	<.0001
d_DXCCSR_RSP014	Pneumothorax	1	0.7747573334	0.0295535909	26.2153366162	<.0001
d_DXCCSR_RSP016	Other specified and unspecified lower respiratory disease	1	0.4389510591	0.0112591146	38.9862856483	<.0001
d_DXCCSR_SKN001	Skin and subcutaneous tissue infections	1	-0.0788326471	0.0170594857	-4.6210447753	<.0001
d_DXCCSR_SKN003	Pressure ulcer of skin	1	0.1674444932	0.0114653470	14.6043981581	<.0001
d_DXCCSR_SKN007	Other specified and unspecified skin disorders	1	-0.2713944201	0.0312538602	-8.6835487890	<.0001
d_DXCCSR_SYM003	Shock	1	0.7778250740	0.0216545374	35.9197270595	<.0001
d_DXCCSR_SYM004	Nausea and vomiting	1	-0.2944587886	0.0292820494	-10.0559487843	<.0001
d_DXCCSR_SYM005	Dysphagia	1	-0.1616109205	0.0111851016	-14.4487664339	<.0001
d_DXCCSR_SYM007	Malaise and fatigue	1	-0.1882006815	0.0210336861	-8.9475843900	<.0001
d_DXCCSR_SYM008	Symptoms of mental and substance use conditions	1	0.4050383107	0.0375422356	10.7888702889	<.0001
d_DXCCSR_SYM010	Nervous system signs and symptoms	1	0.0864620243	0.0141853845	6.0951484367	<.0001
d_DXCCSR_SYM011	Genitourinary signs and symptoms	1	-0.1588462888	0.0146167575	-10.8674094930	<.0001
d_DXCCSR_SYM013	Respiratory signs and symptoms	1	-0.3490966294	0.0140924770	-24.7718430620	<.0001
d_DXCCSR_SYM016	Other general signs and symptoms	1	0.2551992637	0.0093231114	27.3727569576	<.0001
d_DXCCSR_SYM017	Abnormal findings without diagnosis	1	-0.0864339046	0.0094744536	-9.1228379176	<.0001
TRNSFER	TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	0.4364118099	0.0185516834	23.5241083677	<.0001
DNR	Do not resuscitate flag	1	0.7528430666	0.0120851472	62.2949023427	<.0001
COVIDDX_Q1	COVID, Quarter 1, 2020	1	2.0085969573	0.0395798116	50.7480170748	<.0001
COVIDDX_Q2	COVID, Quarter 2, 2020	1	1.6442999142	0.0293185032	56.0840333618	<.0001
COVIDDX_Q3	COVID, Quarter 3, 2020	1	1.3820640615	0.0319815744	43.2143847923	<.0001
COVIDDX_Q4	COVID, Quarter 4, 2020	1	1.2721307727	0.0252776824	50.3262424475	<.0001
COVIDDX_Q5	COVID, Quarter 1, 2021	1	1.3404999129	0.0206139855	65.0286629175	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
COVIDDX_Q6	COVID, Quarter 2, 2021	1	1.2715012267	0.0262190112	48.4953920580	<.0001
COVIDDX_Q7	COVID, Quarter 3, 2021	1	1.5464069801	0.0222409845	69.5296101942	<.0001
COVIDDX_Q8	COVID, Quarter 4, 2021	1	1.5078077791	0.0201490227	74.8327997077	<.0001
YEAR_2019	Discharge YEAR is 2019 or before 2019	1	-0.2419098067	0.0127783487	-18.9312259369	<.0001
Q1	Quarter 1, 2020	1	-0.1903596159	0.0146829505	-12.9646705791	<.0001
Q2	Quarter 2, 2020	1	-0.0410169011	0.0161870446	-2.5339339018	0.0113
Q3	Quarter 3, 2020	1	-0.1013175245	0.0163959906	-6.1794085709	<.0001
Q4	Quarter 4, 2020	1	-0.0329008861	0.0153971932	-2.1368106282	0.0326
Q5	Quarter 1, 2021	1	0.0282573023	0.0148605877	1.9014929169	0.0572
Q6	Quarter 2, 2021	1	-0.1892930735	0.0144951241	-13.0590860696	<.0001
Q7	Quarter 3, 2021	1	-0.0684583938	0.0139334464	-4.9132419740	<.0001
Intercept	Intercept	1	-3.294506943	0.0527128439	-62.4991311087	<.0001

c-statistic=0.84

C-statistics for hospital level indicators are based on the test data (a random sample of 2019-2021 HCUP reference population, not used for the LASSO feature selection).
C-statistics for area level indicators are based on the full reference population data (2021 HCUP reference population).

Table 11. Risk Adjustment Coefficients for IQI 30 - Percutaneous Coronary Intervention (PCI) Mortality Rate

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
Age_40_44	40 <= Age <= 44	1	-0.9085681236	0.0547792819	-16.5859809147	<.0001
Age_45_49	45 <= Age <= 49	1	-0.7640441803	0.0409072134	-18.6774927127	<.0001
Age_50_54	50 <= Age <= 54	1	-0.5843730498	0.0317989364	-18.3771256761	<.0001
Age_55_59	55 <= Age <= 59	1	-0.3851143631	0.0272206054	-14.1478985363	<.0001
Age_60_64	60 <= Age <= 64	1	-0.1423882365	0.0350141563	-4.0665905338	<.0001
Age_70_74	70 <= Age <= 74	1	0.2223644985	0.0219164148	10.1460252611	<.0001
Age_75_79	75 <= Age <= 79	1	0.4275294076	0.0226447116	18.8798786335	<.0001
Age_80_84	80 <= Age <= 84	1	0.6513159359	0.0241283411	26.9938132939	<.0001
Age_85_89	85 <= Age <= 89	1	0.8675881969	0.0267890010	32.3859854029	<.0001
Age_90Plus	Age >= 90	1	1.2181347525	0.0352214555	34.5850202893	<.0001
MALE	Patient Sex Flag: 1=Male / 0=Female	1	-0.2118010269	0.0142652968	-14.8472919347	<.0001
Age_60_64_MALE	60 <= Age <= 64 MALE	1	-0.0798720806	0.0394778745	-2.0232112680	0.0431
MDC_1	Diseases and disorders of the nervous system	1	0.6225679116	0.0939699921	6.6251778648	<.0001
MDC_4	Diseases and disorders of the respiratory system	1	0.5844287319	0.0707213993	8.2638174231	<.0001
MDC_5	Diseases and disorders of the circulatory system	1	-0.3606211230	0.0600836774	-6.0019815498	<.0001
MDC_6	Diseases and disorders of the digestive system	1	1.0651219597	0.0909641618	11.7092483361	<.0001
MDC_7	Diseases and disorders of the hepatobiliary system and pancreas	1	1.1067675457	0.1360803710	8.1331902419	<.0001
MDC_8	Occlusion or stenosis of precerebral or cerebral arteries without infarction	1	0.9144283247	0.0968079662	9.4457962600	<.0001
MDC_17	Myeloproliferative diseases and disorders, poorly differentiated neoplasms	1	1.9339604131	0.2127970240	9.0882869360	<.0001
MDC_18	Infectious and parasitic diseases, systemic or unspecified sites	1	-0.4398542954	0.0759087313	-5.7945151702	<.0001
MDC_22	Burns	1	2.3698146544	0.3435471737	6.8980764086	<.0001
MDC_24	Multiple significant trauma	1	1.4319852397	0.2772530811	5.1649028892	<.0001
d_DXCCSR_BLD006	Coagulation and hemorrhagic disorders	1	0.2482221891	0.0257307429	9.6469110885	<.0001
d_DXCCSR_CIR003	Nonrheumatic and unspecified valve disorders	1	0.0907576115	0.0193936713	4.6797540402	<.0001
d_DXCCSR_CIR005	Myocarditis and cardiomyopathy	1	-0.1353037623	0.0162040842	-8.3499789473	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_CIR007	Essential hypertension	1	-0.2662285838	0.0167172700	-15.9253624743	<.0001
d_DXCCSR_CIR009	Acute myocardial infarction	1	0.4288087833	0.0207696291	20.6459528654	<.0001
d_DXCCSR_CIR011	Coronary atherosclerosis and other heart disease	1	-0.4784443563	0.0206680404	-23.1489946097	<.0001
d_DXCCSR_CIR018	Cardiac arrest and ventricular fibrillation	1	0.5529464527	0.0283524786	19.5025789414	<.0001
d_DXCCSR_CIR026	Peripheral and visceral vascular disease	1	0.2363020137	0.0213597050	11.0629811507	<.0001
d_DXCCSR_CIR031	Hypotension	1	0.2336982296	0.0263332016	8.8746607138	<.0001
d_DXCCSR_CIR032	Other specified and unspecified circulatory disease	1	0.1811896141	0.0223509455	8.1065749183	<.0001
d_DXCCSR_DIG004	Esophageal disorders	1	-0.2354960797	0.0169473118	-13.8957778609	<.0001
d_DXCCSR_DIG018	Hepatic failure	1	0.4570421947	0.0325063475	14.0600907318	<.0001
d_DXCCSR_END001	Thyroid disorders	1	-0.1433319770	0.0186865055	-7.6703467798	<.0001
d_DXCCSR_END003	Diabetes mellitus with complication	1	0.1466200484	0.0173898836	8.4313415475	<.0001
d_DXCCSR_END008	Malnutrition	1	0.1533651177	0.0336675667	4.5552777545	<.0001
d_DXCCSR_END009	Obesity	1	-0.1216615156	0.0173091482	-7.0287407674	<.0001
d_DXCCSR_END010	Disorders of lipid metabolism	1	-0.5332317647	0.0143580694	-37.1381241669	<.0001
d_DXCCSR_END011	Fluid and electrolyte disorders	1	0.4922113789	0.0154864808	31.7832943308	<.0001
d_DXCCSR_END016	Other specified and unspecified nutritional and metabolic disorders	1	-0.1845998195	0.0251661705	-7.3352367778	<.0001
d_DXCCSR_FAC009	Implant, device or graft related encounter	1	-0.1981938847	0.0153104290	-12.9450248807	<.0001
d_DXCCSR_FAC022	Acquired absence of limb or organ	1	-0.2080313442	0.0228230908	-9.1149505752	<.0001
d_DXCCSR_GEN002	Acute and unspecified renal failure	1	0.2578148917	0.0158263679	16.2902122003	<.0001
d_DXCCSR_GEN003	Chronic kidney disease	1	0.1687814904	0.0166179597	10.1565711790	<.0001
d_DXCCSR_GEN004	Urinary tract infections	1	-0.3398532131	0.0316419306	-10.7405966238	<.0001
d_DXCCSR_GEN012	Hyperplasia of prostate	1	-0.3333976679	0.0260278599	-12.8092616407	<.0001
d_DXCCSR_INF002	Septicemia	1	0.4890380581	0.0433564966	11.2794643461	<.0001
d_DXCCSR_INJ033	Complication of cardiovascular device, implant or graft, initial encounter	1	0.1394211567	0.0202653111	6.8797935494	<.0001
d_DXCCSR_MBD005	Anxiety and fear-related disorders	1	-0.1597262356	0.0232349800	-6.8743866234	<.0001
d_DXCCSR_MBD024	Tobacco-related disorders	1	-0.1960957636	0.0173344179	-11.3125093207	<.0001
d_DXCCSR_MUS006	Osteoarthritis	1	-0.1314256947	0.0256416416	-5.1254789661	<.0001
d_DXCCSR_NVS011	Neurocognitive disorders	1	0.1592755618	0.0287928219	5.5317801914	<.0001
d_DXCCSR_NVS013	Coma; stupor; and brain damage	1	1.1292171457	0.0358220275	31.5229824699	<.0001
d_DXCCSR_NVS016	Sleep wake disorders	1	-0.2516434297	0.0211193166	-11.9153206926	<.0001
d_DXCCSR_NVS020	Other nervous system disorders (neither hereditary nor degenerative)	1	0.0898811741	0.0219665192	4.0917349388	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_RSP010	Aspiration pneumonitis	1	-0.3871987178	0.0372671486	-10.3898133453	<.0001
d_DXCCSR_RSP012	Respiratory failure; insufficiency; arrest	1	0.6870290344	0.0174365636	39.4016304266	<.0001
d_DXCCSR_RSP016	Other specified and unspecified lower respiratory disease	1	0.4598720743	0.0288698452	15.9291493012	<.0001
d_DXCCSR_SYM003	Shock	1	0.6766766648	0.0290411310	23.3006305841	<.0001
d_DXCCSR_SYM010	Nervous system signs and symptoms	1	0.1595577930	0.0387795692	4.1144808006	<.0001
d_DXCCSR_SYM017	Abnormal findings without diagnosis	1	-0.1963601601	0.0195157858	-10.0616066257	<.0001
d_IQ30_PRCCSR_CAR003	Coronary artery bypass grafts (CABG)	1	0.7764308136	0.1133802835	6.8480232154	<.0001
d_IQ30_PRCCSR_CAR004	Percutaneous coronary interventions (PCI)	1	-0.2644177474	0.0577317055	-4.5801132130	<.0001
d_IQ30_PRCCSR_CAR008	Angioplasty and related vessel procedures (endovascular; excluding carotid)	1	0.2906926391	0.0537335325	5.4098925817	<.0001
d_IQ30_PRCCSR_CAR012	Vessel repair and replacement	1	0.7552391195	0.0934766515	8.0794413068	<.0001
d_IQ30_PRCCSR_CAR017	Pericardial procedures	1	1.8771469767	0.0656809639	28.5797720413	<.0001
d_IQ30_PRCCSR_CAR020	Saphenous vein harvest and other therapeutic vessel removal	1	0.7561492253	0.1170276770	6.4612854377	<.0001
d_IQ30_PRCCSR_CAR023	Heart valve replacement and other valve procedures (endovascular)	1	0.3555620584	0.0630699483	5.6375828458	<.0001
d_IQ30_PRCCSR_CAR026	Pacemaker and defibrillator procedures	1	0.4179548944	0.0612796848	6.8204478530	<.0001
d_IQ30_PRCCSR_CAR027	Heart assist device procedures	1	1.6511037282	0.0248222773	66.5170125375	<.0001
d_IQ30_PRCCSR_GIS007	GI system drainage (excluding paracentesis)	1	0.7088094245	0.1155197347	6.1358297479	<.0001
TRNSFER	TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	0.0437865373	0.0203917924	2.1472628045	0.0318
CSHOCKANOXBDD	Cardiogenic shock, anoxic brain injury, or cardiac arrest	1	0.9740715025	0.0324447156	30.0225009023	<.0001
COVIDDX_Q2	COVID, Quarter 2, 2020	1	1.5874297200	0.1373329060	11.5589902394	<.0001
COVIDDX_Q3	COVID, Quarter 3, 2020	1	1.6213506480	0.1183995605	13.6938907648	<.0001
COVIDDX_Q4	COVID, Quarter 4, 2020	1	1.7618481125	0.0771301238	22.8425422659	<.0001
COVIDDX_Q5	COVID, Quarter 1, 2021	1	1.3539689188	0.0715121412	18.9334132094	<.0001
COVIDDX_Q6	COVID, Quarter 2, 2021	1	1.3257134689	0.1337194587	9.9141402588	<.0001
COVIDDX_Q7	COVID, Quarter 3, 2021	1	1.8691191765	0.0835697852	22.3659684278	<.0001
COVIDDX_Q8	COVID, Quarter 4, 2021	1	1.7001642262	0.0794654083	21.3950228482	<.0001
YEAR_2019	Discharge YEAR is 2019 or before 2019	1	-0.1006546972	0.0245435945	-4.1010577054	<.0001
Q1	Quarter 1, 2020	1	-0.1191335507	0.0308356309	-3.8635029460	0.0001
Q2	Quarter 2, 2020	1	-0.0593681621	0.0302856963	-1.9602706676	0.0500
Q3	Quarter 3, 2020	1	-0.0808542322	0.0303997413	-2.6597013199	0.0078

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
Q4	Quarter 4, 2020	1	-0.0316897789	0.0308698138	-1.0265620329	0.3046
Q5	Quarter 1, 2021	1	-0.0067034656	0.0307405201	-0.2180661081	0.8274
Q6	Quarter 2, 2021	1	-0.1593819107	0.0294896717	-5.4046688675	<.0001
Q7	Quarter 3, 2021	1	-0.0899918832	0.0309427952	-2.9083307682	0.0036
Intercept	Intercept	1	-3.061783685	0.0903552539	-33.8860614558	<.0001

c-statistic=0.899

C-statistics for hospital level indicators are based on the test data (a random sample of 2019-2021 HCUP reference population, not used for the LASSO feature selection).
C-statistics for area level indicators are based on the full reference population data (2021 HCUP reference population).

Table 12. Risk Adjustment Coefficients for IQI 31 - Carotid Endarterectomy Mortality Rate

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
Age_LT60	Age<60	1	-0.1389331873	0.1804487382	-0.7699316089	0.4413
Age_60_64	60 <= Age <= 64	1	-0.2220535121	0.1785261124	-1.2438153115	0.2136
Age_70_74	70 <= Age <= 74	1	0.2055945399	0.1422054998	1.4457566004	0.1482
Age_75_79	75 <= Age <= 79	1	0.4755227061	0.1415194676	3.3601222094	0.0008
Age_80_84	80 <= Age <= 84	1	0.6939709085	0.1439139251	4.8221248090	<.0001
Age_85_89	85 <= Age <= 89	1	0.7804786758	0.1703070740	4.5827730907	<.0001
Age_90Plus	Age >= 90	1	0.9521745868	0.2618649458	3.6361284781	0.0003
MALE	Patient Sex Flag: 1=Male / 0=Female	1	0.0339314621	0.0795452698	0.4265679435	0.6697
MDC_1	Diseases and disorders of the nervous system	1	-0.8960407605	0.1884174512	-4.7556144855	<.0001
MDC_4	Diseases and disorders of the respiratory system	1	0.3385041878	0.4197710231	0.8064019887	0.4200
MDC_5	Diseases and disorders of the circulatory system	1	0.1318410468	0.2117471894	0.6226342234	0.5335
d_DXCCSR_CIR001	Chronic rheumatic heart disease	1	0.3857855532	0.1814906807	2.1256493812	0.0335
d_DXCCSR_CIR007	Essential hypertension	1	-0.1526439357	0.1067845028	-1.4294577551	0.1529
d_DXCCSR_CIR009	Acute myocardial infarction	1	0.2540899367	0.1898318704	1.3384998847	0.1807
d_DXCCSR_CIR014	Pulmonary heart disease	1	0.3750292036	0.1627972539	2.3036580444	0.0212
d_DXCCSR_CIR017	Cardiac dysrhythmias	1	0.1754655031	0.0978574037	1.7930733535	0.0730
d_DXCCSR_CIR018	Cardiac arrest and ventricular fibrillation	1	2.1944286639	0.3888961568	5.6427111084	<.0001
d_DXCCSR_CIR019	Occlusion or stenosis of precerebral or cerebral arteries without infarction	1	0.4766660481	0.1163674123	4.0962159330	<.0001
d_DXCCSR_CIR023	Occlusion or stenosis of precerebral or cerebral arteries without infarction	1	-0.6657494120	0.1024236809	-6.4999559293	<.0001
d_DXCCSR_DIG004	Esophageal disorders	1	-0.4700516609	0.1048020935	-4.4851361779	<.0001
d_DXCCSR_DIG021	Gastrointestinal hemorrhage	1	0.3252918057	0.2900433270	1.1215283214	0.2621
d_DXCCSR_END008	Malnutrition	1	1.0595336902	0.1622024156	6.5321696119	<.0001
d_DXCCSR_END010	Disorders of lipid metabolism	1	-0.5499855522	0.0838430879	-6.5597005754	<.0001
d_DXCCSR_END011	Fluid and electrolyte disorders	1	0.2364603459	0.1175610672	2.0113831174	0.0443
d_DXCCSR_FAC009	Implant, device or graft related encounter	1	-0.5135271020	0.0971004317	-5.2886181153	<.0001
d_DXCCSR_GEN003	Chronic kidney disease	1	0.6449502517	0.1010220445	6.3842526155	<.0001
d_DXCCSR_NVS008	Paralysis (other than cerebral palsy)	1	0.4230243687	0.1227175572	3.4471381150	0.0006
d_DXCCSR_NVS011	Neurocognitive disorders	1	0.2735110383	0.1512865181	1.8079009401	0.0706
d_DXCCSR_NVS020	Other nervous system disorders (neither hereditary nor degenerative)	1	0.7427463485	0.1165626060	6.3720808418	<.0001

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
d_DXCCSR_RSP002	Pneumonia (except that caused by tuberculosis)	1	0.7300846130	0.1948559437	3.7467915987	0.0002
d_DXCCSR_RSP012	Respiratory failure; insufficiency; arrest	1	0.3096989358	0.1752627380	1.7670552192	0.0772
d_DXCCSR_RSP016	Other specified and unspecified lower respiratory disease	1	0.4197309482	0.2377100219	1.7657267660	0.0774
d_DXCCSR_SYM003	Shock	1	0.5377365495	0.3011217032	1.7857781215	0.0741
d_DXCCSR_SYM005	Dysphagia	1	0.5134749494	0.1639810144	3.1313073111	0.0017
d_DXCCSR_SYM010	Nervous system signs and symptoms	1	0.3707567008	0.1057401598	3.5062997978	0.0005
d_IQ31_PRCCSR_CAR003	Coronary artery bypass grafts (CABG)	1	0.0886095451	0.3129984248	0.2830990128	0.7771
d_IQ31_PRCCSR_CAR007	Embolectomy, endarterectomy, and related vessel procedures (non-endovascular; excluding carotid)	1	0.5589835744	0.3391919789	1.6479858287	0.0994
d_IQ31_PRCCSR_CAR008	Angioplasty and related vessel procedures (endovascular; excluding carotid)	1	0.9405995028	0.2346942739	4.0077650265	<.0001
d_IQ31_PRCCSR_CAR009	Left atrial appendage procedures	1	0.5222098500	0.3538302247	1.4758768854	0.1400
d_IQ31_PRCCSR_CAR010	Ligation and embolization of vessels	1	1.4277935494	0.2881889205	4.9543665553	<.0001
d_IQ31_PRCCSR_CAR012	Vessel repair and replacement	1	0.7405418408	0.3493581560	2.1197210600	0.0340
d_IQ31_PRCCSR_CAR020	Saphenous vein harvest and other therapeutic vessel removal	1	0.6600991349	0.2370409482	2.7847472763	0.0054
d_IQ31_PRCCSR_CAR022	Heart valve replacement and other valve procedures (non-endovascular)	1	0.4185775960	0.3483374981	1.2016438030	0.2295
d_IQ31_PRCCSR_CAR029	Cardiovascular device procedures, NEC	1	1.3145657588	0.2742895874	4.7926199867	<.0001
TRNSFER	TRANSFER FROM ANOTHER ACUTE CARE HOSPITAL	1	0.3838400670	0.1254119046	3.0606350183	0.0022
YEAR_2019	Discharge YEAR is 2019 or before 2019	1	-0.0807738334	0.1598537981	-0.5052981810	0.6133
Q1	Quarter 1, 2020	1	-0.0638465060	0.1899234745	-0.3361696395	0.7367
Q2	Quarter 2, 2020	1	0.1342818031	0.2062458758	0.6510763066	0.5150
Q3	Quarter 3, 2020	1	0.0215870436	0.1987710024	0.1086025796	0.9135
Q4	Quarter 4, 2020	1	-0.1150766837	0.2140573037	-0.5375975578	0.5909
Q5	Quarter 1, 2021	1	0.1963411651	0.1935102602	1.0146292239	0.3103
Q6	Quarter 2, 2021	1	0.2830842237	0.1854879654	1.5261595169	0.1270

Parameter	Label	DF	Estimate	Standard Error	Z-Statistics	Prob Z-Statistics
Q7	Quarter 3, 2021	1	0.0965544634	0.2013779242	0.4794689577	0.6316
Intercept	Intercept	1	-4.587430928	0.2963989813	-15.4772155695	<.0001

c-statistic=0.851

C-statistics for hospital level indicators are based on the test data (a random sample of 2019-2021 HCUP reference population, not used for the LASSO feature selection).
C-statistics for area level indicators are based on the full reference population data (2021 HCUP reference population).

Table 13. Denominator Weights for IQI 90, v2024

INDICATOR	WEIGHT
IQI 08 Esophageal Resection Mortality Rate	0.0077
IQI 09 Pancreatic Resection Mortality Rate	0.0283
IQI 11 Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate	0.0470
IQI 12 Coronary Artery Bypass Graft (CABG) Mortality Rate	0.2427
IQI 30 Percutaneous Coronary Intervention (PCI) Mortality Rate	0.5913
IQI 31 Carotid Endarterectomy Mortality Rate	0.0830
SUM	1.0000

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, State Inpatient Database (SID), 2019, 2020, and 2021.

Table 14. NQF Denominator Weights for IQI 91, v2024

INDICATOR	WEIGHT
IQI 15 Acute Myocardial Infarction (AMI) Mortality Rate	0.1234
IQI 16 Heart Failure Mortality Rate	0.2642
IQI 17 Acute Stroke Mortality Rate	0.1461
IQI 18 Gastrointestinal Hemorrhage Mortality Rate	0.1210
IQI 19 Hip Fracture Mortality Rate	0.0644
IQI 20 Pneumonia Mortality Rate	0.2808
SUM	1.0000

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, State Inpatient Database (SID), 2019, 2020, and 2021.

Appendix: Additional Tables

Table A.1. Population Age Categories

POPCAT	Age Range
Age_LT30	< 30
Age_30_34	30 - 34
Age_35_39	35 - 34
Age_40_44	40 - 44
Age_45_49	45 - 49
Age_50_54	50 - 54
Age_55_59	55 - 59
Age_60_64	60 - 64
Age_65_69	65 - 69
Age_70_74	70 - 74
Age_75_79	75 - 79
Age_80_84	80 - 84
Age_85_89	85 - 89
Age_90Plus	90 plus

Table A.2. Major Diagnostic Categories (MDC)

MDC	Label
1	Diseases and disorders of the nervous system
2	Diseases and disorders of the eye
3	Diseases and disorders of the ear, nose, mouth and throat
4	Diseases and disorders of the respiratory system
5	Diseases and disorders of the circulatory system
6	Diseases and disorders of the digestive system
7	Diseases and disorders of the hepatobiliary system and pancreas
8	Diseases and disorders of the musculoskeletal system and connective tissue
9	Diseases and disorders of the skin, subcutaneous tissue and breast
10	Endocrine, nutritional and metabolic diseases and disorders
11	Diseases and disorders of the kidney and urinary tract
12	Diseases and disorders of the male reproductive system
13	Diseases and disorders of the female reproductive system
14	Pregnancy, childbirth and the puerperium
15	Newborns and other neonates with conditions originating in perinatal period
16	Diseases and disorders of blood, blood forming organs and immunologic disorders
17	Myeloproliferative diseases and disorders, poorly differentiated neoplasms
18	Infectious and parasitic diseases, systemic or unspecified sites
19	Mental diseases and disorders
20	Alcohol or drug use or induced organic mental disorders
21	Injuries, poisonings and toxic effects of drugs
22	Burns
23	Factors influencing health status and other contacts with health services
24	Multiple significant trauma
25	Human immunodeficiency virus infections

Table A.3. Categorical Variables Definitions: Transfer, RTAMINSTD, and CSHOCKANOXBDD

CATEGORY	DESCRIPTION	DEFINITION
TRNSFER	Transfer-in	If admission type (ATYPE) not equal to '4' (newborn) and
		- admission source (ASOURCE) equal to '2' (Another Hospital) or
		- point of origin (POINTOFORIGINUB04) equal to '4' (Transfer from a Hospital), then TRNSFER=1
MRTAMINSTD	Non-STEMI AMI	equals to 1, if any listed diagnosis code present on admission is in the MRTAMINSTD codes
		equals to 0, if no listed diagnosis code is in the MRTAMINSTD codes or if the diagnosis code is not present on admission
		See the 'All ICD-10-CM/PCS coding revisions in MS Excel format' for the IQIs for a full list of codes in MRTAMINSTD
CSHOCKANOXBDD	Cardiogenic shock, anoxic brain injury, or cardiac arrest	equals to 1, if any listed diagnosis code present on admission is in the CSHOCKANOXBDD codes
		equals to 0, if no listed diagnosis code is in the CSHOCKANOXBDD codes or if the diagnosis code is not present on admission
		See the 'All ICD-10-CM/PCS coding revisions in MS Excel format' for the IQIs for a full list of codes in CSHOCKANOXBDD

Table A.4. Do Not Resuscitate (DNR) Status Diagnosis Codes

Diagnosis Code	Description
Z66	Do not resuscitate