

Appendix A. Tricuspid Regurgitation Inclusion ICD9/10 codes

Description	ICD-9/10
Tricuspid valve disorders, specified as non-rheumatic	424.2
Non-rheumatic tricuspid valve insufficiency	I36.1

Appendix B. Tricuspid Regurgitation Exclusion codes

Description	ICD-9	ICD-10
Tricuspid stenosis	397.0	I07.0, I36.0, I36.2, I36.8, I36.9
Rheumatic tricuspid insufficiency	397.0	I07.1, I07.2, I07.8, I07.9, I08.1, I08.2, I08.3
Rheumatic mitral insufficiency	394.0, 394.1, 394.2, 394.9	I05.0, I05.1, I05.2, I05.8, I05.9
Primary organ disease	164.1, 212.7, 238.8, 239.89, 259.2, 421.0, 746.1, 746.2, 746.89, 861.00-861.13, 996.01, 996.04, 997.1, 998.2, 998.89	C38.0, D15.1, D48.7, D49.89, E34.0, I33.0, I97.51, I97.89, S26.#, T82.190#, Q22.4, Q22.5, Q22.6, Q22.8, Q22.9
Valve prolapse	424.0	I34.1

Appendix C. Heart Failure diagnosis codes

Code	Description	ICD-9/10
398.91	Rheumatic (congestive) heart failure	9
402.01	Hypertensive heart disease, malignant, with heart failure	9
402.11	Hypertensive heart disease, benign, with heart failure	9
402.91	Hypertensive heart disease, unspecified, with heart failure	9
404.01	Hypertensive heart and chronic kidney disease, malignant, with heart failure and with chronic kidney disease stage I through stage IV, or unspecified	9
404.11	Hypertensive heart and chronic kidney disease, benign, with heart failure and with chronic kidney disease stage I through stage IV, or unspecified	9
404.91	Hypertensive heart and chronic kidney disease, unspecified, with heart failure and with chronic kidney disease stage I through stage IV, or unspecified	9
404.03	Hypertensive heart and chronic kidney disease, malignant, with heart failure and with chronic kidney disease stage V or end stage renal disease	9
404.13	Hypertensive heart and chronic kidney disease, benign, with heart failure and chronic kidney disease stage V or end stage renal disease	9
404.93	Hypertensive heart and chronic kidney disease, unspecified, with heart failure and chronic kidney disease stage V or end stage renal disease	9
428.0	Congestive heart failure, unspecified	9
428.1	Left heart failure	9
428.20	Unspecified systolic heart failure	9
428.21	Acute systolic heart failure	9
428.22	Chronic systolic heart failure	9
428.23	Acute on chronic systolic heart failure	9
428.30	Unspecified diastolic heart failure	9

428.31	Acute diastolic heart failure	9
428.32	Chronic diastolic heart failure	9
428.33	Acute on chronic diastolic heart failure	9
428.40	Unspecified combined systolic and diastolic heart failure	9
428.41	Acute combined systolic and diastolic heart failure	9
428.42	Chronic combined systolic and diastolic heart failure	9
428.43	Acute on chronic combined systolic and diastolic heart failure	9
428.9	Heart failure, unspecified	9
I09.81	Rheumatic heart failure	10
I11.0	Hypertensive heart disease with heart failure	10
I13.0	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease	10
I13.2	Hypertensive heart and chronic kidney disease with heart failure and with stage 5 chronic kidney disease, or end stage renal disease	10
I50.#	Heart failure	10

Appendix D. Valvular Severity Conditions

Condition	ICD-9	ICD-10	CPT
TR surgery	35.14	02QJ---	33460
	35.27	02RJ---	33463
	35.28	02UJ---	33464
	35.33	02WJ--	33465
			33468
			33600
Pulmonary hypertension with:	416.0	I27.0	
Ascites	789.59	R18.8	
Edema	782.3	R60.0	
Hepatic insufficiency	573.8	K72.90	

Appendix E. Elixhauser Comorbidity Index

Comorbidity	ICD-9 Coding	ICD-10 Coding
Elixhauser Comorbidities		
Congestive Heart Failure	398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 425.4–425.9, 428.x	I09.9#, I11.0#, I13.0#, I13.2#, I25.5#, I42.0#, I42.5#, I42.6#, I42.7#, I42.8#, I42.9#, I43.#, I50.#, P29.0#
Cardiac Arrhythmia	426.0, 426.13, 426.7, 426.9, 426.10, 426.12, 427.0–427.4, 427.6–427.9, 785.0, 996.01, 996.04, V45.0, V53.3	I44.1#, I44.2#, I44.3#, I45.6#, I45.9#, I47.#, I48.#, I49.#, R00.0#, R00.1#, R00.8#, T82.1#, Z45.0#, Z95.0#
Valvular Disease	093.2, 394.x–397.x, 424.x, 746.3–746.6, V42.2, V43.3	A52.0#, I05.#, I06.#, I07.#, I08.#, I09.1#, I09.8#, I34.#, I35.#, I36.#, I37.#, I38.#, I39.#, Q23.0#, Q23.1#, Q23.2#, Q23.3#, Z95.2#, Z95.4#
Pulmonary Circulation Disorders	415.0, 415.1, 416.x, 417.0, 417.8, 417.9	I26.#, I27.#, I28.0#, I28.8#, I28.9#
Peripheral Vascular Disorders	093.0, 437.3, 440.x, 441.x, 093.0, 437.3, 440.x, 441.x, 443.1–443.9, 447.1, 557.1, 557.9, V43.4	I70.#, I71.#, I73.1#, I73.8#, I73.9#, I77.1#, I79.0#, I79.2#, K55.1#, K55.8#, K55.9#, Z95.8#, Z95.9#
Hypertension (Uncomplicated)	401.x	I10.#
Hypertension (Complicated)	402.x–405.x	I11.#, I12.#, I13.#, I15.#
Paralysis	334.1, 342.x, 343.x, 344.0–344.6, 344.9	G04.1#, G11.4#, G80.1#, G80.2#, G81.#, G82.#, G83.0#, G83.1#, G83.2#, G83.3#, G83.4#, G83.9#

Other Neurological Disorders	331.9, 332.0, 332.1, 333.4, 333.5, 333.92, 334.x–335.x, 336.2, 340.x, 341.x, 345.x, 348.1, 348.3, 780.3, 784.3	G10.#, G11.#, G12.#, G13.#, G20.#, G21.#, G22.#, G25.4#, G25.5#, G31.2#, G31.8#, G31.9#, G32.#, G35.#, G36.#, G37.#, G40.#, G41.#, G93.1#, G93.4#, R47.0#, R56.#
Chronic Pulmonary Disease	416.8, 416.9, 490.x –505.x, 506.4, 508.1, 508.8	I27.8#, I27.9#, J40.#, J41.#, J42.#, J43.#, J44.#, J45.#, J46.#, J47.#, J60.#, J61.#, J62.#, J63.#, J64.#, J65.#, J66.#, J67.#, J68.4#, J70.1#, J70.3#
Diabetes (Uncomplicated)	250.0–250.3	E10.0#, E10.1#, E10.9#, E11.0#, E11.1#, E11.9#, E12.0#, E12.1#, E12.9#, E13.0#, E13.1#, E13.9#, E14.0#, E14.1#, E14.9#
Diabetes (Complicated)	250.4–250.9	E10.2#, E10.3#, E10.4#, E10.5#, E10.6#, E10.7#, E10.8#, E11.2#, E11.3#, E11.4#, E11.5#, E11.6#, E11.7#, E11.8#, E12.2#, E12.3#, E12.4#, E12.5#, E12.6#, E12.7#, E12.8#, E13.2#, E13.3#, E13.4#, E13.5#, E13.6#, E13.7#, E13.8#, E14.2#, E14.3#, E14.4#, E14.5#, E14.6#, E14.7#, E14.8#
Hypothyroidism	240.9, 243.x, 244.x, 246.1, 246.8	E00.#, E01.#, E02.#, E03.#, E89.0#
Renal Failure	403.01, 403.11, 403.91, 404.02, 404.03, 404.12, 404.13, 404.92, 404.93, 585.x, 586.x, 588.0, V42.0, V45.1, V56.x	I12.0#, I13.1#, N18.#, N19.#, N25.0#, Z49.0#, Z49.1#, Z49.2#, Z94.0#, Z99.2#

Liver Disease	070.22, 070.23, 070.32, 070.33, 070.44, 070.54, 070.6, 070.9, 456.0–456.2, 570.x, 571.x, 572.2–572.8, 573.3, 573.4, 573.8, 573.9, V42.7	B18.#, I85.#, I86.4#, I98.2#, K70.#, K71.1#, K71.3#, K71.4#, K71.5#, K71.7#, K72.#, K73.#, K74.#, K76.0#, K76.2#, K76.3#, K76.4#, K76.5#, K76.6#, K76.7#, K76.8#, K76.9#, Z94.4#
Peptic Ulcer Disease (excluding bleeding)	531.7, 531.9, 532.7, 532.9, 533.7, 533.9, 534.7, 534.9	K25.7#, K25.9#, K26.7#, K26.9#, K27.7#, K27.9#, K28.7#, K28.9#
AIDS/HIV	042.x–044.x	B20.#, B21.#, B22.#, B24.#
Lymphoma	200.x–202.x, 203.0, 238.6	C81.#, C82.#, C83.#, C84.#, C85.#, C88.#, C96.#, C90.0#, C90.2#
Metastatic Cancer	196.x–199.x	C77.#, C78.#, C79.#, C80.#
Solid Tumor without Metastasis	140.x–172.x, 174.x–195.x	C0#, C1#, C20.#, C21.#, C22.#, C23.#, C24.#, C25.#, C26.#, C30.#, C31.#, C32.#, C33.#, C34.#, C37.#, C38.#, C39.#, C40.#, C41.#, C43.#, C45.#, C46.#, C47.#, C48.#, C49.#, C50.#, C51.#, C52.#, C53.#, C54.#, C55.#, C56.#, C57.#, C58.#, C6#, C70.#, C71.#, C72.#, C73.#, C74.#, C75.#, C76.#, C97.#
Rheumatoid Arthritis Collagen	446.x, 701.0, 710.0–710.4, 710.8, 710.9, 711.2, 714.x, 719.3, 720.x, 725.x, 728.5, 728.89, 729.30	L94.0#, L94.1#, L94.3#, M05.#, M06.#, M08.#, M12.0#, M12.3#, M30.#, M31.0#, M31.1#, M31.2#, M31.3#, M32.#, M33.#, M34.#, M35.#, M45.#, M46.1#, M46.8#, M46.9#
Coagulopathy	286.x, 287.1, 287.3–287.5	D65.#, D66.#, D67.#, D68.#, D69.1#, D69.3#, D69.4#, D69.5#, D69.6#
Obesity	278	E66.#

Weight Loss	260.x–263.x, 783.2, 799.4	E40.#, E41.#, E42.#, E43.#, E44.#, E45.#, E46.#, R63.4#, R64#
Fluid and Electrolyte Disorders	253.6, 276.x	E22.2#, E86.#, E87.#
Blood Loss Anemia	280	D50.0#
Deficiency Anemia	280.1–280.9, 281.x	D50.8#, D50.9#, D51.#, D52.#, D53.#
Alcohol Abuse	265.2, 291.1–291.3, 291.5–291.9, 303.0, 303.9, 305.0, 357.5, 425.5, 535.3, 571.0–571.3, 980.x, V11.3	F10.#, E52, G62.1#, I42.6, K29.2#, K70.0#, K70.3#, K70.9#, T51.#, Z50.2#, Z71.4#, Z72.1#
Drug Abuse	292.x, 304.x, 305.2–305.9, V65.42	F11.#, F12.#, F13.#, F14.#, F15.#, F16.#, F18.#, F19.#, Z71.5#, Z72.2#
Psychoses	293.8, 295.x, 296.04, 296.14, 296.44, 296.54, 297.x, 298.x	F20.#, F22.#, F23.#, F24.#, F25.#, F28.#, F29.#, F30.2#, F31.2#, F31.5#
Depression	296.2, 296.3, 296.5, 300.4, 309.x, 311	F20.4#, F31.3#, F31.4#, F31.5#, F32.#, F33.#, F34.1#, F41.2#, F43.2#