

Appendix H. Disaggregation Analysis

Table I1. Overall Age Statistics Across Datasets on the 6-Month Feature Space						
Dataset	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Training Set	71.08	0.00%	3.57%	11.10%	74.91%	10.43%
Calibration Set	71.04	0.00%	3.58%	11.24%	74.83%	10.35%
Validation Set	71.05	0.00%	3.58%	11.18%	74.83%	10.40%
Test Set	70.82	0.00%	3.56%	11.57%	71.99%	12.88%

Table I2. Age Statistics By Label Across Datasets on the 6-Month Feature Space							
Dataset	Label	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Training Set	Not Super Utilizer	71.04	0.00%	3.50%	10.99%	75.40%	10.12%
	Super Utilizer	72.40	0.00%	6.08%	15.03%	57.32%	21.56%
Calibration Set	Not Super Utilizer	71.00	0.00%	3.52%	11.13%	75.31%	10.05%
	Super Utilizer	72.48	0.00%	5.84%	15.15%	57.80%	21.21%
Validation Set	Not Super Utilizer	71.01	0.00%	3.51%	11.08%	75.31%	10.11%
	Super Utilizer	72.27	0.01%	6.32%	14.84%	57.74%	21.09%
Test Set	Not Super Utilizer	70.76	0.00%	3.50%	11.46%	72.53%	12.51%
	Super Utilizer	72.92	0.01%	5.88%	15.33%	53.07%	25.71%

Table I3. Overall Gender Statistics Across Datasets on the 6-Month Feature Space

Dataset	% Male	% Female
Training Set	42.16%	57.84%
Calibration Set	42.08%	57.92%
Validation Set	42.07%	57.93%
Test Set	41.98%	58.02%

Table I4. Gender Statistics By Label Across Datasets on the 6-Month Feature Space			
Dataset	Label	% Male	% Female
Training Set	Not Super Utilizer	42.47%	57.53%
	Super Utilizer	30.93%	69.07%
Calibration Set	Not Super Utilizer	42.41%	57.60%
	Super Utilizer	30.40%	69.61%
Validation Set	Not Super Utilizer	42.41%	57.59%
	Super Utilizer	29.86%	70.14%
Test Set	Not Super Utilizer	42.31%	57.69%
	Super Utilizer	30.55%	69.45%

Table I5. Overall Race Statistics Across Datasets on the 6-Month Feature Space							
Dataset	Unknown	White	Black	Other	Asian	Hispanic	Native American
Training Set	1.86%	81.61%	9.12%	2.03%	2.45%	2.34%	0.59%
Calibration Set	1.87%	81.72%	9.08%	1.98%	2.42%	2.34%	0.59%
Validation Set	1.83%	81.64%	9.14%	1.99%	2.45%	2.36%	0.60%

Test Set	2.24%	81.21%	9.20%	1.90%	2.45%	2.40%	0.59%
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Table I6. Race Statistics By Label Across Datasets on the 6-Month Feature Space

Dataset	Label	Unknown	White	Black	Other	Asian	Hispanic	Native American
Training Set	Not Super Utilizer	1.89%	81.72%	8.98%	2.04%	2.47%	2.31%	0.59%
	Super Utilizer	0.90%	77.61%	14.18%	1.40%	1.81%	3.32%	0.78%
Calibration Set	Not Super Utilizer	1.89%	81.83%	8.94%	2.00%	2.44%	2.32%	0.59%
	Super Utilizer	0.95%	77.72%	13.99%	1.40%	1.84%	3.33%	0.77%
Validation Set	Not Super Utilizer	1.85%	81.74%	9.02%	2.00%	2.46%	2.34%	0.59%
	Super Utilizer	0.85%	78.04%	13.48%	1.35%	2.07%	3.31%	0.90%
Test Set	Not Super Utilizer	2.27%	81.29%	9.08%	1.92%	2.47%	2.38%	0.58%
	Super Utilizer	1.07%	78.28%	13.61%	1.18%	1.70%	3.24%	0.92%

Table I7. Overall Medicare Status Statistics Across Datasets on the 6-Month Feature Space

Dataset	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Training Set	86.46%	0.01%	13.81%	0.01%	0.01%	0.30%
Calibration Set	86.31%	0.00%	13.98%	0.01%	0.01%	0.31%
Validation Set	86.36%	0.00%	13.91%	0.00%	0.01%	0.29%
Test Set	86.18%	0.01%	14.09%	0.01%	0.01%	0.30%

Table I8. Medicare Status Statistics By Label Across Datasets on the 6-Month Feature Space

Dataset	Label	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
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Training Set	Not Super Utilizer	86.65%	0.01%	13.61%	0.01%	0.01%	0.29%
	Super Utilizer	79.71%	0.01%	20.68%	0.02%	0.01%	0.43%
Calibration Set	Not Super Utilizer	86.50%	0.00%	13.79%	0.01%	0.01%	0.31%
	Super Utilizer	79.71%	0.02%	20.81%	0.00%	0.00%	0.54%
Validation Set	Not Super Utilizer	86.55%	0.00%	13.71%	0.00%	0.01%	0.29%
	Super Utilizer	79.42%	0.00%	20.84%	0.01%	0.02%	0.29%
Test Set	Not Super Utilizer	86.37%	0.01%	13.90%	0.01%	0.01%	0.30%
	Super Utilizer	79.65%	0.01%	20.71%	0.01%	0.02%	0.39%

Table I9. Overall Dual Status Statistics Across Datasets on the 6-Month Feature Space

Dataset	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Training Set	84.12%	2.49%	9.68%	1.45%	0.55%	0.05%	0.75%	2.92%	0.02%	0.04%	1.89%
Calibration Set	84.14%	2.47%	9.68%	1.47%	0.54%	0.05%	0.76%	2.91%	0.02%	0.04%	1.91%
Validation Set	84.11%	2.50%	9.72%	1.44%	0.55%	0.05%	0.75%	2.92%	0.02%	0.03%	1.93%
Test Set	84.00%	2.46%	9.76%	1.45%	0.58%	0.05%	0.73%	3.10%	0.02%	0.04%	2.01%

Table I10. Overall Dual Status Statistics Across Datasets on the 6-Month Feature Space

Dataset	Label	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Training Set	Not Super Utilizer	84.50%	2.44%	9.43%	1.42%	0.52%	0.05%	0.74%	2.82%	0.02%	0.04%	1.83%

	Super Utilizer	70.33%	4.18%	18.48%	2.58%	1.38%	0.12%	1.15%	6.35%	0.03%	0.05%	4.21%
	Not Super Utilizer	84.52%	2.42%	9.44%	1.46%	0.52%	0.05%	0.74%	2.82%	0.02%	0.04%	1.84%
Calibration Set	Super Utilizer	70.50%	4.24%	18.42%	2.07%	1.38%	0.09%	1.42%	6.33%	0.07%	0.05%	4.11%
	Not Super Utilizer	84.48%	2.45%	9.47%	1.42%	0.53%	0.05%	0.74%	2.84%	0.02%	0.03%	1.86%
Validation Set	Super Utilizer	70.85%	4.40%	18.47%	2.04%	1.31%	0.11%	1.10%	6.04%	0.06%	0.08%	4.12%
	Not Super Utilizer	84.37%	2.41%	9.52%	1.42%	0.56%	0.05%	0.72%	3.01%	0.02%	0.04%	1.96%
Test Set	Super Utilizer	70.99%	4.20%	18.00%	2.28%	1.28%	0.09%	1.20%	5.98%	0.03%	0.08%	3.73%

Table I11. Overall Age Statistics Across Datasets on the 12-Month Feature Space

Dataset	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Training Set	71.56	0.00%	3.53%	9.95%	75.13%	11.39%
Calibration Set	71.54	0.00%	3.46%	10.04%	75.22%	11.27%
Validation Set	71.57	0.00%	3.50%	9.93%	75.20%	11.37%
Test Set	71.56	0.00%	3.45%	10.01%	75.18%	11.35%

Table I12. Age Statistics By Label Across Datasets on the 12-Month Feature Space

Dataset	Label	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Training Set	Not Super Utilizer	71.52	0.00%	3.47%	9.82%	75.64%	11.07%
	Super Utilizer	73.02	0.00%	5.48%	14.57%	56.84%	23.12%
Calibration Set	Not Super Utilizer	71.50	0.00%	3.40%	9.93%	75.74%	10.92%
	Super Utilizer	73.15	0.00%	5.62%	14.22%	56.60%	23.55%
Validation Set	Not Super Utilizer	71.53	0.00%	3.44%	9.79%	75.72%	11.05%

	Super Utilizer	72.89	0.00%	5.65%	14.78%	56.90%	22.68%
Test Set	Not Super Utilizer	71.53	0.00%	3.39%	9.88%	75.67%	11.06%
	Super Utilizer	72.87	0.02%	5.63%	14.62%	58.03%	21.71%

Table I13. Overall Gender Statistics Across Datasets on the 12-Month Feature Space

Dataset	% Male	% Female
Training Set	41.35%	58.65%
Calibration Set	41.63%	58.37%
Validation Set	41.15%	58.85%
Test Set	41.32%	58.69%

Table I14. Gender Statistics By Label Across Datasets on the 12-Month Feature Space

Dataset	Label	% Male	% Female
Training Set	Not Super Utilizer	41.66%	58.34%
	Super Utilizer	30.25%	69.76%
Calibration Set	Not Super Utilizer	41.93%	58.07%
	Super Utilizer	30.85%	69.15%
Validation Set	Not Super Utilizer	41.49%	58.51%
	Super Utilizer	29.28%	70.72%
Test Set	Not Super Utilizer	41.64%	58.36%
	Super Utilizer	29.78%	70.22%

Table I15. Overall Race Statistics Across Datasets on the 12-Month Feature Space							
Dataset	Unknown	White	Black	Other	Asian	Hispanic	Native American
Training Set	1.93%	80.78%	9.34%	2.16%	2.71%	2.48%	0.59%
Calibration Set	1.85%	80.85%	9.31%	2.17%	2.70%	2.55%	0.59%
Validation Set	1.85%	80.92%	9.43%	2.11%	2.56%	2.51%	0.61%
Test Set	1.90%	81.02%	9.38%	2.09%	2.59%	2.43%	0.60%

Table I16. Race Statistics By Label Across Datasets on the 12-Month Feature Space								
Dataset	Label	Unknown	White	Black	Other	Asian	Hispanic	Native American
Training Set	Not Super Utilizer	1.96%	80.88%	9.21%	2.18%	2.74%	2.46%	0.59%
	Super Utilizer	0.93%	77.43%	14.14%	1.56%	1.76%	3.33%	0.85%
Calibration Set	Not Super Utilizer	1.87%	80.94%	9.17%	2.18%	2.72%	2.53%	0.58%
	Super Utilizer	0.89%	77.53%	14.06%	1.48%	1.84%	3.22%	0.99%
Validation Set	Not Super Utilizer	1.88%	81.02%	9.31%	2.12%	2.58%	2.48%	0.60%
	Super Utilizer	0.96%	77.53%	13.66%	1.48%	1.78%	3.53%	1.07%
Test Set	Not Super Utilizer	1.92%	81.09%	9.27%	2.12%	2.61%	2.40%	0.59%
	Super Utilizer	0.93%	78.71%	13.37%	1.04%	1.68%	3.47%	0.80%

Table I17. Overall Medicare Status Statistics Across Datasets on the 12-Month Feature Space						
Dataset	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Training Set	86.68%	0.01%	13.94%	0.01%	0.01%	0.66%

Calibration Set	86.64%	0.01%	13.99%	0.01%	0.01%	0.67%
Validation Set	86.75%	0.00%	13.85%	0.01%	0.01%	0.63%
Test Set	86.69%	0.01%	13.91%	0.01%	0.01%	0.63%

Table I18. Medicare Status Statistics By Label Across Datasets on the 12-Month Feature Space

Dataset	Label	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Training Set	Not Super Utilizer	86.87%	0.01%	13.75%	0.01%	0.01%	0.65%
	Super Utilizer	80.15%	0.04%	20.78%	0.03%	0.00%	1.01%
Calibration Set	Not Super Utilizer	86.82%	0.01%	13.81%	0.01%	0.01%	0.66%
	Super Utilizer	80.29%	0.00%	20.60%	0.00%	0.03%	0.92%
Validation Set	Not Super Utilizer	86.94%	0.00%	13.65%	0.01%	0.01%	0.62%
	Super Utilizer	79.87%	0.02%	20.99%	0.02%	0.00%	0.91%
Test Set	Not Super Utilizer	86.88%	0.01%	13.72%	0.01%	0.01%	0.63%
	Super Utilizer	79.99%	0.00%	20.68%	0.02%	0.06%	0.75%

Table I19. Overall Dual Status Statistics Across Datasets on the 12-Month Feature Space

Dataset	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Training Set	84.58%	2.66%	10.28%	1.59%	0.64%	0.05%	0.85%	3.40%	0.03%	0.07%	3.60%
Calibration Set	84.65%	2.68%	10.24%	1.59%	0.63%	0.06%	0.87%	3.41%	0.03%	0.07%	3.61%
Validation Set	84.58%	2.66%	10.23%	1.59%	0.65%	0.05%	0.83%	3.43%	0.03%	0.06%	3.56%

Test Set	84.67%	2.63%	10.16%	1.57%	0.66%	0.05%	0.85%	3.44%	0.03%	0.08%	3.57%
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Table I20. Overall Dual Status Statistics Across Datasets on the 12-Month Feature Space

Dataset	Label	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Training Set	Not Super Utilizer	84.92%	2.61%	10.06%	1.57%	0.62%	0.05%	0.84%	3.31%	0.03%	0.07%	3.53%
	Super Utilizer	72.69%	4.71%	17.91%	2.63%	1.44%	0.10%	1.22%	6.89%	0.00%	0.11%	6.40%
Calibration Set	Not Super Utilizer	84.99%	2.63%	10.04%	1.57%	0.62%	0.06%	0.85%	3.30%	0.03%	0.06%	3.54%
	Super Utilizer	72.73%	4.53%	17.48%	2.46%	1.12%	0.03%	1.28%	7.33%	0.00%	0.20%	6.08%
Validation Set	Not Super Utilizer	84.96%	2.60%	9.96%	1.57%	0.63%	0.05%	0.81%	3.33%	0.03%	0.06%	3.47%
	Super Utilizer	71.13%	4.83%	19.85%	2.35%	1.53%	0.11%	1.39%	6.83%	0.09%	0.05%	6.94%
Test Set	Not Super Utilizer	85.03%	2.58%	9.91%	1.55%	0.63%	0.05%	0.83%	3.36%	0.03%	0.08%	3.49%
	Super Utilizer	71.85%	4.43%	19.05%	2.45%	1.60%	0.06%	1.62%	6.45%	0.08%	0.13%	6.61%

Table I21. Age Statistics for XGBoost Predictions on the 6-month feature space

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Not Super Utilizer	1,328,858	97.25%	70.79	0.00%	3.43%	11.34%	72.80%	12.42%
Super Utilizer	37,576	2.75%	72.14	0.01%	8.27%	19.55%	43.08%	29.09%

Table I22. Age Statistics for XGBoost Predictions on the 6-month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
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Not Predicted	1,328,858	97.25%	70.79	0.00%	3.43%	11.34%	72.80%	12.42%
Upper Quintile	18,788	1.37%	70.15	0.02%	10.37%	22.22%	41.56%	25.82%
Upper-Middle Quintile	6,263	0.46%	73.72	0.00%	6.42%	17.31%	44.96%	31.31%
Middle Quintile	3,131	0.23%	73.39	0.00%	6.13%	18.43%	45.74%	29.70%
Lower-Middle Quintile	1,879	0.14%	74.31	0.00%	6.55%	15.75%	44.70%	33.00%
Lower Quintile	7,515	0.55%	74.74	0.00%	5.89%	16.14%	43.78%	34.18%

Table I23. Age Statistics for XGBoost Predictions on the 6-month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Not Super Utilizer	1,358,918	99.45%	70.84	0.00%	3.51%	11.49%	72.17%	12.83%
Super Utilizer	7,516	0.55%	67.13	0.03%	13.66%	25.80%	39.00%	21.51%

Table I24. Age Statistics for XGBoost Predictions on the 6-month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Not Predicted	1,358,918	99.45%	70.84	0.00%	3.51%	11.49%	72.17%	12.83%
Upper Quintile	3,758	0.28%	64.29	0.00%	17.35%	29.16%	35.31%	18.17%
Upper-Middle Quintile	1,253	0.09%	69.73	0.08%	11.17%	21.15%	42.62%	24.98%
Middle Quintile	626	0.05%	69.07	0.00%	10.06%	25.56%	41.21%	23.16%
Lower-Middle Quintile	376	0.03%	69.76	0.00%	9.31%	22.87%	44.68%	23.14%
Lower Quintile	1,503	0.11%	70.59	0.07%	9.12%	22.09%	42.85%	25.88%

Table I25. Gender Statistics for XGBoost Predictions on the 6-month feature space

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Super Utilizer	1,328,858	97.25%	42.50%	57.50%
Super Utilizer	37,576	2.75%	23.62%	76.38%

Table I26. Gender Statistics for XGBoost Predictions on the 6-month feature space by Quintile*

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Predicted	1,328,858	97.25%	42.50%	57.50%
Upper Quintile	18,788	1.37%	23.88%	76.12%
Upper-Middle Quintile	6,263	0.46%	22.50%	77.50%
Middle Quintile	3,131	0.23%	24.88%	75.12%
Lower-Middle Quintile	1,879	0.14%	22.51%	77.49%
Lower Quintile	7,515	0.55%	23.65%	76.35%

Table I27. Gender Statistics for XGBoost Predictions on the 6-month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Super Utilizer	1,358,918	99.45%	42.07%	57.93%
Super Utilizer	7,516	0.55%	25.92%	74.08%

Table I28. Gender Statistics for XGBoost Predictions on the 6-month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Predicted	1,358,918	99.45%	42.07%	57.93%
Upper Quintile	3,758	0.28%	26.10%	73.90%

Upper-Middle Quintile	1,253	0.09%	25.38%	74.62%
Middle Quintile	626	0.05%	27.00%	73.00%
Lower-Middle Quintile	376	0.03%	23.94%	76.06%
Lower Quintile	1,503	0.11%	25.95%	74.05%

Table I29. Race Statistics for XGBoost Predictions on the 6-month feature space

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Super Utilizer	1,328,858	97.25%	2.28%	81.41%	8.97%	1.93%	2.48%	2.36%	0.58%
Super Utilizer	37,576	2.75%	0.82%	74.33%	17.58%	0.96%	1.47%	3.96%	0.88%

Table I30. Race Statistics for XGBoost Predictions on the 6-month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Predicted	1,328,858	97.25%	2.28%	81.41%	8.97%	1.93%	2.48%	2.36%	0.58%
Upper Quintile	18,788	1.37%	0.73%	72.34%	19.41%	0.92%	1.56%	4.16%	0.88%
Upper-Middle Quintile	6,263	0.46%	0.67%	76.24%	15.93%	0.94%	1.20%	4.01%	1.01%
Middle Quintile	3,131	0.23%	1.25%	75.98%	15.78%	1.02%	1.37%	3.96%	0.64%
Lower-Middle Quintile	1,879	0.14%	0.96%	76.53%	14.69%	1.38%	1.44%	4.15%	0.85%
Lower Quintile	7,515	0.55%	0.94%	76.50%	15.86%	0.93%	1.53%	3.35%	0.88%

Table I31. Race Statistics for XGBoost Predictions on the 6-month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Super Utilizer	1,358,918	97.25%	2.25%	81.27%	9.14%	1.91%	2.46%	2.39%	0.59%

Super Utilizer	7,516	2.75%	0.85%	69.85%	21.34%	0.89%	1.38%	4.67%	1.01%
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Table I32. Race Statistics for XGBoost Predictions on the 6-month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Predicted	1,358,918	99.45%	2.25%	81.27%	9.14%	1.91%	2.46%	2.39%	0.59%
Upper Quintile	3,758	0.28%	0.93%	68.31%	23.28%	0.88%	0.93%	4.52%	1.14%
Upper-Middle Quintile	1,253	0.09%	0.80%	70.07%	20.67%	0.80%	2.00%	4.55%	1.12%
Middle Quintile	626	0.05%	0.48%	73.16%	18.21%	1.12%	2.08%	4.47%	0.48%
Lower-Middle Quintile	376	0.03%	0.53%	66.76%	22.87%	1.33%	1.86%	6.38%	0.27%
Lower Quintile	1,503	0.11%	0.93%	72.92%	17.96%	0.80%	1.60%	4.79%	1.00%

Table I33. Medicare Status Statistics for XGBoost Predictions on the 6-month feature space

Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Super Utilizer	1,328,858	97.25%	86.56%	0.01%	13.71%	0.01%	0.01%	0.30%
Super Utilizer	37,576	2.75%	72.87%	0.01%	27.53%	0.02%	0.05%	0.49%

Table I34. Medicare Status Statistics for XGBoost Predictions on the 6-month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Predicted	1,328,858	97.25%	86.56%	0.01%	13.71%	0.01%	0.01%	0.30%
Upper Quintile	18,788	1.37%	68.09%	0.02%	32.29%	0.03%	0.08%	0.51%
Upper-Middle Quintile	6,263	0.46%	77.04%	0.00%	23.46%	0.03%	0.00%	0.53%
Middle Quintile	3,131	0.23%	76.30%	0.00%	24.40%	0.03%	0.00%	0.73%

Lower-Middle Quintile	1,879	0.14%	78.29%	0.05%	22.09%	0.00%	0.11%	0.53%
Lower Quintile	7,515	0.55%	78.56%	0.00%	21.70%	0.00%	0.01%	0.28%

Table I35. Medicare Status Statistics for XGBoost Predictions on the 6-month feature space in the Upper Quintile								
Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Super Utilizer	1,358,918	97.25%	86.32%	0.01%	13.95%	0.01%	0.01%	0.30%
Super Utilizer	7,516	2.75%	61.16%	0.03%	39.17%	0.00%	0.05%	0.41%

Table I36. Medicare Status Statistics for XGBoost Predictions on the 6-month feature space by Quintile Within the Upper Quintile								
Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Predicted	1,358,918	99.45%	86.32%	0.01%	13.95%	0.01%	0.01%	0.30%
Upper Quintile	3,758	0.28%	54.10%	0.05%	46.17%	0.00%	0.05%	0.37%
Upper-Middle Quintile	1,253	0.09%	68.40%	0.00%	32.08%	0.00%	0.08%	0.56%
Middle Quintile	626	0.05%	65.34%	0.00%	35.30%	0.00%	0.00%	0.64%
Lower-Middle Quintile	376	0.03%	67.82%	0.00%	32.45%	0.00%	0.00%	0.27%
Lower Quintile	1,503	0.11%	69.39%	0.00%	30.87%	0.00%	0.07%	0.33%

Table I37. Dual Status Statistics for XGBoost Predictions on the 6-month feature space													
Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Super Utilizer	1,328,858	97.25%	84.72%	2.37%	9.30%	1.41%	0.54%	0.05%	0.71%	2.91%	0.02%	0.04%	1.90%
Super Utilizer	37,576	2.75%	58.41%	5.56%	26.11%	2.96%	2.09%	0.15%	1.48%	9.67%	0.07%	0.08%	6.02%

Table I38. Dual Status Statistics for XGBoost Predictions on the 6-month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Predicted	1,328,858	97.25%	84.72%	2.37%	9.30%	1.41%	0.54%	0.05%	0.71%	2.91%	0.02%	0.04%	1.90%
Upper Quintile	18,788	1.37%	53.25%	6.15%	29.49%	3.18%	2.42%	0.19%	1.51%	10.67%	0.09%	0.07%	6.44%
Upper-Middle Quintile	6,263	0.46%	61.95%	4.77%	24.60%	2.78%	1.92%	0.11%	1.53%	8.59%	0.05%	0.08%	5.81%
Middle Quintile	3,131	0.23%	62.12%	4.82%	23.60%	2.81%	1.95%	0.13%	1.34%	9.87%	0.06%	0.06%	6.26%
Lower-Middle Quintile	1,879	0.14%	65.14%	4.63%	22.19%	2.45%	1.38%	0.11%	1.06%	9.47%	0.00%	0.05%	5.69%
Lower Quintile	7,515	0.55%	65.12%	5.30%	20.92%	2.77%	1.68%	0.09%	1.54%	8.02%	0.07%	0.12%	5.12%

Table I39. Dual Status Statistics for XGBoost Predictions on the 6-month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Super Utilizer	1,358,918	97.25%	84.20%	2.44%	9.63%	1.44%	0.57%	0.05%	0.73%	3.05%	0.02%	0.04%	1.98%
Super Utilizer	7,516	2.75%	46.91%	6.99%	34.27%	3.38%	2.82%	0.21%	1.66%	12.08%	0.08%	0.05%	7.76%

Table I40. Dual Status Statistics for XGBoost Predictions on the 6-month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Predicted	1,358,918	99.45%	84.20%	2.44%	9.63%	1.44%	0.57%	0.05%	0.73%	3.05%	0.02%	0.04%	1.98%
Upper Quintile	3,758	0.28%	42.87%	7.74%	36.99%	3.46%	3.03%	0.21%	1.76%	12.75%	0.03%	0.08%	8.09%
Upper-Middle Quintile	1,253	0.09%	52.83%	5.99%	29.21%	3.75%	3.03%	0.16%	1.20%	11.49%	0.24%	0.08%	7.42%
Middle Quintile	626	0.05%	50.00%	6.87%	30.83%	3.99%	1.92%	0.16%	2.08%	11.50%	0.32%	0.00%	7.03%

Lower-Middle Quintile	376	0.03%	47.61%	5.85%	36.97%	3.19%	1.60%	0.27%	2.39%	11.17%	0.00%	0.00%	8.51%
Lower Quintile	1,503	0.11%	50.63%	6.25%	32.47%	2.66%	2.79%	0.27%	1.46%	11.38%	0.00%	0.00%	7.32%

Table I41. Dual Status Statistics for o2v BiLSTM Predictions on the 6-month feature space

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Super Utilizer	1,328,858	97.25%	84.01%	2.46%	9.76%	1.45%	0.58%	0.05%	0.73%	3.09%	0.02%	0.04%	2.01%
Super Utilizer	37,576	2.75%	83.69%	2.60%	9.65%	1.53%	0.57%	0.06%	0.70%	3.33%	0.02%	0.03%	2.04%

Table I42. Age Statistics for o2v BiLSTM Predictions on the 6-month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Not Predicted	1,328,858	97.25%	70.82	0.00%	3.57%	11.57%	71.99%	12.88%
Upper Quintile	18,788	1.37%	70.81	0.01%	3.46%	11.64%	72.27%	12.62%
Upper-Middle Quintile	6,263	0.46%	71.06	0.00%	3.34%	12.30%	70.25%	14.12%
Middle Quintile	3,131	0.23%	70.86	0.00%	3.45%	10.98%	72.70%	12.87%
Lower-Middle Quintile	1,879	0.14%	70.77	0.00%	4.10%	11.87%	70.93%	13.10%
Lower Quintile	7,515	0.55%	70.88	0.00%	3.63%	11.11%	72.15%	13.11%

Table I43. Age Statistics for o2v BiLSTM Predictions on the 6-month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Not Super Utilizer	1,358,918	99.45%	70.82	0.00%	3.56%	11.57%	71.98%	12.88%
Super Utilizer	7,516	0.55%	70.75	0.03%	3.58%	11.16%	72.47%	12.76%

Table I44. Age Statistics for o2v BiLSTM Predictions on the 6-month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Not Predicted	1,358,918	99.45%	70.82	0.00%	3.56%	11.57%	71.98%	12.88%
Upper Quintile	3,758	0.28%	70.43	0.00%	3.81%	11.34%	73.36%	11.50%
Upper-Middle Quintile	1,253	0.09%	70.84	0.00%	4.55%	10.38%	71.33%	13.74%
Middle Quintile	626	0.05%	70.98	0.00%	2.71%	10.53%	73.52%	13.24%
Lower-Middle Quintile	376	0.03%	70.49	0.27%	3.73%	13.33%	68.00%	14.67%
Lower Quintile	1,503	0.11%	71.41	0.07%	2.53%	11.11%	71.86%	14.44%

Table I45. Gender Statistics for o2v BiLSTM Predictions on the 6-month feature space

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Super Utilizer	1,328,858	97.25%	41.97%	58.03%
Super Utilizer	37,576	2.75%	42.32%	57.68%

Table I46. Gender Statistics for o2v BiLSTM Predictions on the 6-month feature space by Quintile*

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Predicted	1,328,858	97.25%	41.97%	58.03%
Upper Quintile	18,788	1.37%	42.13%	57.87%
Upper-Middle Quintile	6,263	0.46%	42.02%	57.98%
Middle Quintile	3,131	0.23%	43.93%	56.07%
Lower-Middle Quintile	1,879	0.14%	40.10%	59.90%
Lower Quintile	7,515	0.55%	42.91%	57.09%

Table I47. Gender Statistics for o2v BiLSTM Predictions on the 6-month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Super Utilizer	1,358,918	99.45%	41.98%	58.02%
Super Utilizer	7,516	0.55%	42.22%	57.78%

Table I48. Gender Statistics for o2v BiLSTM Predictions on the 6-month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Predicted	1,358,918	99.45%	41.98%	58.02%
Upper Quintile	3,758	0.28%	42.39%	57.61%
Upper-Middle Quintile	1,253	0.09%	41.61%	58.39%
Middle Quintile	626	0.05%	43.22%	56.78%
Lower-Middle Quintile	376	0.03%	43.20%	56.80%
Lower Quintile	1,503	0.11%	41.65%	58.35%

Table I49. Race Statistics for o2v BiLSTM Predictions on the 6-month feature space

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Super Utilizer	1,328,858	97.25%	2.24%	81.21%	9.20%	1.91%	2.45%	2.40%	0.59%
Super Utilizer	37,576	2.75%	2.33%	81.10%	9.26%	1.77%	2.55%	2.34%	0.65%

Table I50. Race Statistics for o2v BiLSTM Predictions on the 6-month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
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Not Predicted	1,328,858	97.25%	2.24%	81.21%	9.20%	1.91%	2.45%	2.40%	0.59%
Upper Quintile	18,788	1.37%	2.36%	81.11%	9.07%	1.84%	2.62%	2.36%	0.64%
Upper-Middle Quintile	6,263	0.46%	2.28%	80.53%	9.79%	1.74%	2.33%	2.51%	0.81%
Middle Quintile	3,131	0.23%	1.92%	80.87%	9.67%	1.82%	2.59%	2.65%	0.48%
Lower-Middle Quintile	1,879	0.14%	2.61%	79.93%	9.42%	1.92%	2.93%	2.56%	0.64%
Lower Quintile	7,515	0.55%	2.41%	81.93%	9.06%	1.54%	2.46%	2.00%	0.60%

Table I51. Race Statistics for o2v BiLSTM Predictions on the 6-month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Super Utilizer	1,358,918	99.45%	2.24%	81.21%	9.21%	1.90%	2.45%	2.40%	0.59%
Super Utilizer	7,516	0.55%	2.55%	81.53%	8.49%	1.73%	2.61%	2.44%	0.65%

Table I52. Race Statistics for o2v BiLSTM Predictions on the 6-month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Predicted	1,358,918	99.45%	2.24%	81.21%	9.21%	1.90%	2.45%	2.40%	0.59%
Upper Quintile	3,758	0.28%	2.32%	81.11%	8.70%	1.49%	3.01%	2.82%	0.56%
Upper-Middle Quintile	1,253	0.09%	3.51%	81.31%	6.63%	2.00%	2.88%	2.48%	1.20%
Middle Quintile	626	0.05%	2.55%	81.34%	10.37%	1.91%	1.91%	1.75%	0.16%
Lower-Middle Quintile	376	0.03%	1.60%	83.47%	7.20%	2.13%	2.13%	2.93%	0.53%
Lower Quintile	1,503	0.11%	2.59%	82.37%	9.05%	1.93%	1.80%	1.60%	0.67%

Table I53. Medicare Status Statistics for o2v BiLSTM Predictions on the 6-month feature space

Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
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Not Super Utilizer	1,328,858	97.25%	86.18%	0.01%	14.09%	0.01%	0.01%	0.30%
Super Utilizer	37,576	2.75%	86.27%	0.01%	14.02%	0.01%	0.01%	0.33%

Table I54. Medicare Status Statistics for o2v BiLSTM Predictions on the 6-month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Predicted	1,328,858	97.25%	86.18%	0.01%	14.09%	0.01%	0.01%	0.30%
Upper Quintile	18,788	1.37%	86.25%	0.00%	14.06%	0.01%	0.02%	0.34%
Upper-Middle Quintile	6,263	0.46%	85.92%	0.00%	14.32%	0.02%	0.00%	0.26%
Middle Quintile	3,131	0.23%	86.69%	0.00%	13.57%	0.00%	0.00%	0.26%
Lower-Middle Quintile	1,879	0.14%	85.57%	0.00%	14.86%	0.05%	0.00%	0.53%
Lower Quintile	7,515	0.55%	86.64%	0.03%	13.65%	0.00%	0.01%	0.33%

Table I55. Medicare Status Statistics for o2v BiLSTM Predictions on the 6-month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Super Utilizer	1,358,918	99.45%	86.18%	0.01%	14.09%	0.01%	0.01%	0.30%
Super Utilizer	7,516	0.55%	86.63%	0.00%	13.69%	0.03%	0.04%	0.39%

Table I56. Medicare Status Statistics for o2v BiLSTM Predictions on the 6-month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Predicted	1,358,918	99.45%	86.18%	0.01%	14.09%	0.01%	0.01%	0.30%
Upper Quintile	3,758	0.28%	86.40%	0.00%	13.89%	0.03%	0.03%	0.35%
Upper-Middle Quintile	1,253	0.09%	86.18%	0.00%	14.14%	0.08%	0.00%	0.40%
Middle Quintile	626	0.05%	88.04%	0.00%	12.12%	0.00%	0.00%	0.16%

Lower-Middle Quintile	376	0.03%	83.47%	0.00%	16.53%	0.00%	0.27%	0.27%
Lower Quintile	1,503	0.11%	87.76%	0.00%	12.77%	0.00%	0.07%	0.60%

Table I57. Dual Status Statistics for o2v BiLSTM Predictions on the 6-month feature space

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Super Utilizer	1,328,858	97.25%	84.01%	2.46%	9.76%	1.45%	0.58%	0.05%	0.73%	3.09%	0.02%	0.04%	2.01%
Super Utilizer	37,576	2.75%	83.69%	2.60%	9.65%	1.53%	0.57%	0.06%	0.70%	3.33%	0.02%	0.03%	2.04%

Table I58. Dual Status Statistics for o2v BiLSTM Predictions on the 6-month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Predicted	1,328,858	97.25%	84.01%	2.46%	9.76%	1.45%	0.58%	0.05%	0.73%	3.09%	0.02%	0.04%	2.01%
Upper Quintile	18,788	1.37%	84.03%	2.65%	9.40%	1.52%	0.61%	0.10%	0.68%	3.26%	0.02%	0.04%	2.11%
Upper-Middle Quintile	6,263	0.46%	83.57%	2.44%	10.08%	1.56%	0.45%	0.02%	0.69%	3.11%	0.05%	0.03%	1.90%
Middle Quintile	3,131	0.23%	82.82%	2.71%	9.83%	1.82%	0.54%	0.03%	0.64%	3.58%	0.00%	0.00%	1.85%
Lower-Middle Quintile	1,879	0.14%	82.96%	2.45%	9.90%	1.54%	0.80%	0.00%	0.64%	3.67%	0.00%	0.00%	1.81%
Lower Quintile	7,515	0.55%	83.50%	2.59%	9.77%	1.42%	0.56%	0.01%	0.81%	3.51%	0.01%	0.01%	2.12%

Table I59. Dual Status Statistics for o2v BiLSTM Predictions on the 6-month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Super Utilizer	1,358,918	99.45%	84.00%	2.46%	9.76%	1.45%	0.58%	0.05%	0.73%	3.10%	0.02%	0.04%	2.01%
Super Utilizer	7,516	0.55%	84.19%	2.34%	9.67%	1.53%	0.64%	0.05%	0.49%	3.06%	0.04%	0.07%	1.89%

Table I60. Dual Status Statistics for o2v BiLSTM Predictions on the 6-month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Predicted	1,358,918	99.45%	84.00%	2.46%	9.76%	1.45%	0.58%	0.05%	0.73%	3.10%	0.02%	0.04%	2.01%
Upper Quintile	3,758	0.28%	84.33%	2.05%	9.63%	1.70%	0.67%	0.08%	0.43%	3.03%	0.00%	0.03%	1.78%
Upper-Middle Quintile	1,253	0.09%	84.03%	3.43%	9.42%	1.20%	0.64%	0.00%	0.64%	2.64%	0.16%	0.16%	2.00%
Middle Quintile	626	0.05%	82.30%	2.39%	11.00%	1.59%	1.12%	0.00%	0.16%	3.99%	0.00%	0.16%	2.39%
Lower-Middle Quintile	376	0.03%	86.13%	2.13%	9.07%	0.27%	0.27%	0.00%	0.27%	3.47%	0.00%	0.00%	1.60%
Lower Quintile	1,503	0.11%	84.30%	2.20%	9.58%	1.66%	0.47%	0.07%	0.73%	2.99%	0.07%	0.07%	1.93%

Table I61. Age Statistics for XGBoost Predictions on the 12-Month feature space

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Not Super Utilizer	221,094	97.25%	71.56	0.00%	3.32%	9.73%	76.01%	10.94%
Super Utilizer	6,251	2.75%	71.82	0.03%	8.16%	20.00%	45.77%	26.04%

Table I62. Age Statistics for XGBoost Predictions on the 12-Month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Not Predicted	221,094	97.25%	71.56	0.00%	3.32%	9.73%	76.01%	10.94%
Upper Quintile	3,126	1.38%	69.84	0.06%	10.40%	23.06%	42.42%	24.06%
Upper-Middle Quintile	1,042	0.46%	73.27	0.00%	6.33%	18.43%	48.56%	26.68%
Middle Quintile	521	0.23%	74.28	0.00%	5.57%	15.74%	49.14%	29.56%
Lower-Middle Quintile	312	0.14%	73.49	0.00%	7.37%	15.38%	47.44%	29.81%

Lower Quintile	1,250	0.55%	74.12	0.00%	5.36%	16.56%	50.00%	28.08%
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Table I63. Age Statistics for XGBoost Predictions on the 12-Month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Not Super Utilizer	226,094	99.45%	71.61	0.00%	3.37%	9.91%	75.40%	11.32%
Super Utilizer	1,251	0.55%	63.68	0.16%	19.02%	28.38%	35.33%	17.11%

Table I64. Age Statistics for XGBoost Predictions on the 12-Month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Not Predicted	226,094	99.45%	71.61	0.00%	3.37%	9.91%	75.40%	11.32%
Upper Quintile	626	0.28%	63.02	0.00%	20.93%	28.59%	32.43%	18.05%
Upper-Middle Quintile	208	0.09%	62.05	0.48%	19.71%	30.77%	36.06%	12.98%
Middle Quintile	105	0.05%	61.48	0.00%	20.95%	29.52%	36.19%	13.33%
Lower-Middle Quintile	62	0.03%	62.89	0.00%	20.97%	29.03%	40.32%	9.68%
Lower Quintile	250	0.11%	67.80	0.40%	12.40%	25.20%	40.40%	21.60%

Table I65. Gender Statistics for XGBoost Predictions on the 12-Month feature space

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Super Utilizer	221,094	97.25%	41.80%	58.21%
Super Utilizer	6,251	2.75%	24.36%	75.64%

Table I66. Gender Statistics for XGBoost Predictions on the 12-Month feature space by Quintile*

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Predicted	221,094	97.25%	41.80%	58.21%
Upper Quintile	3,126	1.38%	25.05%	74.95%
Upper-Middle Quintile	1,042	0.46%	23.61%	76.39%
Middle Quintile	521	0.23%	24.76%	75.24%
Lower-Middle Quintile	312	0.14%	20.83%	79.17%
Lower Quintile	1,250	0.55%	24.00%	76.00%

Table I67. Gender Statistics for XGBoost Predictions on the 12-Month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Super Utilizer	226,094	99.45%	41.40%	58.60%
Super Utilizer	1,251	0.55%	26.62%	73.38%

Table I68. Gender Statistics for XGBoost Predictions on the 12-Month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Predicted	226,094	99.45%	41.40%	58.60%
Upper Quintile	626	0.28%	29.55%	70.45%
Upper-Middle Quintile	208	0.09%	22.60%	77.40%
Middle Quintile	105	0.05%	27.62%	72.38%
Lower-Middle Quintile	62	0.03%	29.03%	70.97%
Lower Quintile	250	0.11%	21.60%	78.40%

Table I69. Race Statistics for XGBoost Predictions on the 12-Month feature space

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Super Utilizer	221,094	97.25%	1.93%	81.16%	9.20%	2.12%	2.61%	2.39%	0.59%
Super Utilizer	6,251	2.75%	0.64%	76.23%	15.89%	1.02%	1.66%	3.79%	0.77%

Table I70. Race Statistics for XGBoost Predictions on the 12-Month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Predicted	221,094	97.25%	1.93%	81.16%	9.20%	2.12%	2.61%	2.39%	0.59%
Upper Quintile	3,126	1.37%	0.64%	74.02%	17.47%	1.18%	1.57%	4.19%	0.93%
Upper-Middle Quintile	1,042	0.46%	0.19%	77.26%	15.07%	0.77%	2.21%	3.84%	0.67%
Middle Quintile	521	0.23%	0.58%	80.61%	13.24%	0.38%	1.34%	3.26%	0.58%
Lower-Middle Quintile	312	0.14%	0.64%	76.60%	14.74%	0.96%	2.88%	3.85%	0.32%
Lower Quintile	1,250	0.55%	1.04%	78.96%	14.00%	1.12%	1.28%	2.96%	0.64%

Table I71. Race Statistics for XGBoost Predictions on the 12-Month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Super Utilizer	226,094	97.25%	1.90%	81.09%	9.32%	2.09%	2.59%	2.41%	0.59%
Super Utilizer	1,251	2.75%	1.04%	69.22%	21.42%	0.64%	1.60%	4.88%	1.20%

Table I72. Race Statistics for XGBoost Predictions on the 12-Month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Predicted	226,094	99.45%	1.90%	81.09%	9.32%	2.09%	2.59%	2.41%	0.59%
Upper Quintile	626	0.28%	1.60%	66.77%	22.84%	0.64%	1.44%	5.27%	1.44%

Upper-Middle Quintile	208	0.09%	0.96%	68.75%	23.56%	0.48%	0.96%	4.81%	0.48%
Middle Quintile	105	0.05%	0.00%	70.48%	19.05%	0.00%	3.81%	4.76%	1.90%
Lower-Middle Quintile	62	0.03%	0.00%	75.81%	16.13%	3.23%	0.00%	4.84%	0.00%
Lower Quintile	250	0.11%	0.40%	73.60%	18.40%	0.40%	2.00%	4.00%	1.20%

Table I73. Medicare Status Statistics for XGBoost Predictions on the 12-Month feature space

Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Super Utilizer	221,094	97.25%	87.11%	0.01%	13.49%	0.01%	0.01%	0.62%
Super Utilizer	6,251	2.75%	72.04%	0.02%	28.97%	0.02%	0.06%	1.10%

Table I74. Medicare Status Statistics for XGBoost Predictions on the 12-Month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Predicted	221,094	97.25%	87.11%	0.01%	13.49%	0.01%	0.01%	0.62%
Upper Quintile	3,126	1.37%	66.76%	0.00%	34.23%	0.00%	0.10%	1.09%
Upper-Middle Quintile	1,042	0.46%	75.53%	0.00%	25.24%	0.00%	0.00%	0.77%
Middle Quintile	521	0.23%	78.89%	0.00%	22.07%	0.00%	0.00%	0.96%
Lower-Middle Quintile	312	0.14%	77.24%	0.00%	23.40%	0.00%	0.32%	0.96%
Lower Quintile	1,250	0.55%	78.16%	0.08%	23.20%	0.08%	0.00%	1.52%

Table I75. Medicare Status Statistics for XGBoost Predictions on the 12-Month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Super Utilizer	226,094	97.25%	86.88%	0.01%	13.72%	0.01%	0.01%	0.63%
Super Utilizer	1,251	2.75%	52.52%	0.00%	48.04%	0.00%	0.24%	0.80%

Table I76. Medicare Status Statistics for XGBoost Predictions on the 12-Month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Predicted	226,094	97.25%	86.88%	0.01%	13.72%	0.01%	0.01%	0.63%
Upper Quintile	626	1.37%	50.48%	0.00%	50.16%	0.00%	0.00%	0.64%
Upper-Middle Quintile	208	0.46%	49.52%	0.00%	51.44%	0.00%	0.96%	1.92%
Middle Quintile	105	0.23%	49.52%	0.00%	50.48%	0.00%	0.00%	0.00%
Lower-Middle Quintile	62	0.14%	50.00%	0.00%	50.00%	0.00%	0.00%	0.00%
Lower Quintile	250	0.55%	62.00%	0.00%	38.40%	0.00%	0.40%	0.80%

Table I77. Dual Status Statistics for XGBoost Predictions on the 12-Month feature space

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Super Utilizer	221,094	97.25%	85.31%	2.55%	9.71%	1.53%	0.61%	0.04%	0.82%	3.23%	0.03%	0.08%	3.37%
Super Utilizer	6,251	2.75%	62.10%	5.46%	26.12%	3.12%	2.30%	0.21%	2.00%	11.04%	0.10%	0.16%	10.69%

Table I78. Dual Status Statistics for XGBoost Predictions on the 12-Month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Predicted	221,094	97.25%	85.31%	2.55%	9.71%	1.53%	0.61%	0.04%	0.82%	3.23%	0.03%	0.08%	3.37%
Upper Quintile	3,126	1.37%	56.37%	6.24%	30.04%	3.71%	2.82%	0.22%	2.27%	11.87%	0.10%	0.16%	11.77%
Upper-Middle Quintile	1,042	0.46%	66.22%	3.93%	23.61%	3.17%	1.63%	0.29%	1.54%	11.32%	0.10%	0.48%	10.46%
Middle Quintile	521	0.23%	68.71%	6.14%	21.88%	2.88%	2.11%	0.19%	2.30%	9.40%	0.19%	0.00%	11.52%

Lower-Middle Quintile	312	0.14%	66.67%	3.85%	25.64%	1.60%	1.28%	0.00%	1.60%	9.62%	0.00%	0.00%	9.29%
Lower Quintile	1,250	0.55%	69.12%	4.88%	20.32%	2.08%	1.92%	0.16%	1.68%	9.76%	0.08%	0.00%	8.16%

Table I79. Dual Status Statistics for XGBoost Predictions on the 12-Month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Super Utilizer	226,094	97.25%	84.87%	2.60%	10.02%	1.56%	0.64%	0.05%	0.84%	3.39%	0.03%	0.08%	3.51%
Super Utilizer	1,251	2.75%	48.36%	7.59%	36.37%	4.40%	3.52%	0.32%	2.80%	13.75%	0.24%	0.16%	14.71%

Table I80. Dual Status Statistics for XGBoost Predictions on the 12-Month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Predicted	226,094	97.25%	84.87%	2.60%	10.02%	1.56%	0.64%	0.05%	0.84%	3.39%	0.03%	0.08%	3.51%
Upper Quintile	626	1.37%	47.60%	7.83%	37.86%	4.31%	3.19%	0.32%	3.19%	13.90%	0.16%	0.00%	15.81%
Upper-Middle Quintile	208	0.46%	47.60%	6.73%	37.98%	5.29%	2.88%	0.48%	2.40%	12.50%	0.48%	0.48%	14.42%
Middle Quintile	105	0.23%	45.71%	9.52%	40.00%	3.81%	5.71%	0.00%	1.90%	11.43%	0.00%	0.95%	13.33%
Lower-Middle Quintile	62	0.14%	48.39%	9.68%	33.87%	1.61%	1.61%	0.00%	3.23%	22.58%	0.00%	0.00%	17.74%
Lower Quintile	250	0.55%	52.00%	6.40%	30.40%	4.80%	4.40%	0.40%	2.40%	13.20%	0.40%	0.00%	12.00%

Table I81. Age Statistics for o2v BiLSTM Predictions on the 12-Month feature space

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Not Super Utilizer	221,094	97.25%	70.82	0.00%	3.57%	11.57%	71.99%	12.88%
Super Utilizer	6,251	2.75%	70.87	0.01%	3.51%	11.60%	71.88%	13.01%

Table I82. Age Statistics for o2v BiLSTM Predictions on the 12-Month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Not Predicted	221,094	97.25%	78.61	0.00%	2.10%	10.00%	62.41%	25.49%
Upper Quintile	3,126	1.38%	78.58	0.00%	1.79%	8.96%	68.11%	21.15%
Upper-Middle Quintile	1,042	0.46%	78.30	0.00%	2.88%	8.64%	65.64%	22.84%
Middle Quintile	521	0.23%	78.00	0.00%	1.34%	11.32%	66.22%	21.11%
Lower-Middle Quintile	312	0.14%	77.20	0.00%	3.85%	10.90%	64.42%	20.83%
Lower Quintile	1,250	0.55%	78.43	0.00%	2.16%	10.08%	63.92%	23.84%

Table I83. Age Statistics for o2v BiLSTM Predictions on the 12-Month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Not Super Utilizer	226,094	99.45%	78.60	0.00%	2.10%	9.99%	62.50%	25.40%
Super Utilizer	1,251	0.55%	78.94	0.00%	1.28%	8.87%	67.79%	22.06%

Table I84. Age Statistics for o2v BiLSTM Predictions on the 12-Month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Mean Age	% Age 0-18	% Age 19-44	% Age 45-64	% Age 65-84	% Age 85+
Not Predicted	226,094	99.45%	78.60	0.00%	2.10%	9.99%	62.50%	25.40%
Upper Quintile	626	0.28%	79.20	0.00%	0.96%	8.47%	68.21%	22.36%
Upper-Middle Quintile	208	0.09%	78.19	0.00%	1.44%	12.98%	61.06%	24.52%
Middle Quintile	105	0.05%	78.81	0.00%	0.95%	9.52%	70.48%	19.05%
Lower-Middle Quintile	62	0.03%	76.81	0.00%	1.61%	14.52%	69.35%	14.52%
Lower Quintile	250	0.11%	79.50	0.00%	2.00%	4.80%	70.80%	22.40%

Table I85. Gender Statistics for o2v BiLSTM Predictions on the 12-Month feature space

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Super Utilizer	221,094	97.25%	37.62%	62.38%
Super Utilizer	6,251	2.75%	39.34%	60.68%

Table I86. Gender Statistics for o2v BiLSTM Predictions on the 12-Month feature space by Quintile*

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Predicted	221,094	97.25%	37.62%	62.38%
Upper Quintile	3,126	1.38%	38.32%	61.71%
Upper-Middle Quintile	1,042	0.46%	40.21%	59.79%
Middle Quintile	521	0.23%	42.80%	57.20%
Lower-Middle Quintile	312	0.14%	40.71%	59.29%
Lower Quintile	1,250	0.55%	39.36%	60.64%

Table I87. Gender Statistics for o2v BiLSTM Predictions on the 12-Month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Super Utilizer	226,094	99.45%	37.67%	62.33%
Super Utilizer	1,251	0.55%	39.17%	60.91%

Table I88. Gender Statistics for o2v BiLSTM Predictions on the 12-Month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	% Male	% Female
Not Predicted	226,094	99.45%	37.67%	62.33%

Upper Quintile	626	0.28%	42.01%	57.99%
Upper-Middle Quintile	208	0.09%	37.02%	63.46%
Middle Quintile	105	0.05%	36.19%	63.81%
Lower-Middle Quintile	62	0.03%	46.77%	53.23%
Lower Quintile	250	0.11%	33.20%	66.80%

Table I89. Race Statistics for o2v BiLSTM Predictions on the 12-Month feature space

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Super Utilizer	221,094	97.25%	0.10%	82.57%	7.16%	2.76%	3.41%	3.13%	0.87%
Super Utilizer	6,251	2.75%	0.06%	83.63%	7.28%	2.53%	2.83%	2.96%	0.70%

Table I90. Race Statistics for o2v BiLSTM Predictions on the 12-Month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Predicted	221,094	97.25%	0.10%	82.57%	7.16%	2.76%	3.41%	3.13%	0.87%
Upper Quintile	3,126	1.37%	0.00%	83.17%	7.52%	3.10%	2.27%	3.26%	0.67%
Upper-Middle Quintile	1,042	0.46%	0.10%	85.41%	5.76%	1.82%	2.88%	2.98%	1.06%
Middle Quintile	521	0.23%	0.19%	82.92%	9.60%	2.11%	3.07%	1.92%	0.19%
Lower-Middle Quintile	312	0.14%	0.00%	83.01%	7.05%	1.28%	4.81%	2.88%	0.96%
Lower Quintile	1,250	0.55%	0.16%	83.76%	7.04%	2.16%	3.60%	2.64%	0.64%

Table I91. Race Statistics for o2v BiLSTM Predictions on the 12-Month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Super Utilizer	226,094	97.25%	0.10%	82.61%	7.16%	2.75%	3.40%	3.12%	0.86%

Super Utilizer	1,251	2.75%	0.00%	81.69%	8.15%	3.12%	2.64%	3.92%	0.48%
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Table I92. Race Statistics for o2v BiLSTM Predictions on the 12-Month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Unknown	White	Black	Other	Asian	Hispanic	Native American
Not Predicted	226,094	99.45%	0.10%	82.61%	7.16%	2.75%	3.40%	3.12%	0.86%
Upper Quintile	626	0.28%	0.00%	83.23%	6.71%	2.88%	3.04%	3.67%	0.48%
Upper-Middle Quintile	208	0.09%	0.00%	77.88%	12.02%	2.88%	1.44%	5.77%	0.00%
Middle Quintile	105	0.05%	0.00%	84.76%	8.57%	1.90%	0.95%	2.86%	0.95%
Lower-Middle Quintile	62	0.03%	0.00%	79.03%	6.45%	8.06%	1.61%	4.84%	0.00%
Lower Quintile	250	0.11%	0.00%	80.40%	8.80%	3.20%	3.60%	3.20%	0.80%

Table I93. Medicare Status Statistics for o2v BiLSTM Predictions on the 12-Month feature space

Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Super Utilizer	221,094	97.25%	88.22%	0.01%	12.02%	0.00%	0.02%	0.27%
Super Utilizer	6,251	2.75%	88.77%	0.00%	11.55%	0.00%	0.00%	0.32%

Table I94. Medicare Status Statistics for o2v BiLSTM Predictions on the 12-Month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Predicted	221,094	97.25%	88.22%	0.01%	12.02%	0.00%	0.02%	0.27%
Upper Quintile	3,126	1.37%	89.60%	0.00%	10.75%	0.00%	0.00%	0.35%
Upper-Middle Quintile	1,042	0.46%	88.68%	0.00%	11.71%	0.00%	0.00%	0.38%
Middle Quintile	521	0.23%	87.52%	0.00%	12.48%	0.00%	0.00%	0.00%
Lower-Middle Quintile	312	0.14%	85.58%	0.00%	14.74%	0.00%	0.00%	0.32%

Lower Quintile	1,250	0.55%	88.08%	0.00%	12.24%	0.00%	0.00%	0.32%
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Table I95. Medicare Status Statistics for o2v BiLSTM Predictions on the 12-Month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Super Utilizer	226,094	97.25%	88.22%	0.01%	12.01%	0.00%	0.02%	0.27%
Super Utilizer	1,251	2.75%	90.33%	0.00%	10.23%	0.00%	0.00%	0.56%

Table I96. Medicare Status Statistics for o2v BiLSTM Predictions on the 12-Month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Aged No ESRD	Aged ESRD	Disabled	Disabled ESRD	ESRD	Multiple
Not Predicted	226,094	97.25%	88.22%	0.01%	12.01%	0.00%	0.02%	0.27%
Upper Quintile	626	1.37%	90.89%	0.00%	9.42%	0.00%	0.00%	0.32%
Upper-Middle Quintile	208	0.46%	86.54%	0.00%	14.90%	0.00%	0.00%	1.44%
Middle Quintile	105	0.23%	90.48%	0.00%	10.48%	0.00%	0.00%	0.95%
Lower-Middle Quintile	62	0.14%	83.87%	0.00%	16.13%	0.00%	0.00%	0.00%
Lower Quintile	250	0.55%	93.60%	0.00%	6.80%	0.00%	0.00%	0.40%

Table I97. Dual Status Statistics for o2v BiLSTM Predictions on the 12-Month feature space

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Super Utilizer	221,094	97.25%	79.37%	2.46%	13.52%	1.38%	0.91%	0.07%	0.76%	3.56%	0.02%	0.03%	1.92%
Super Utilizer	6,251	2.75%	80.00%	2.32%	12.75%	1.33%	1.04%	0.10%	0.88%	3.76%	0.02%	0.06%	2.06%

Table I98. Dual Status Statistics for o2v BiLSTM Predictions on the 12-Month feature space by Quintile

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Predicted	221,094	97.25%	79.37%	2.46%	13.52%	1.38%	0.91%	0.07%	0.76%	3.56%	0.02%	0.03%	1.92%
Upper Quintile	3,126	1.37%	81.06%	2.34%	12.28%	1.06%	0.90%	0.03%	0.83%	3.52%	0.03%	0.03%	1.82%
Upper-Middle Quintile	1,042	0.46%	79.75%	2.59%	12.19%	1.73%	1.25%	0.10%	0.77%	4.32%	0.00%	0.10%	2.50%
Middle Quintile	521	0.23%	81.19%	2.11%	11.71%	1.15%	0.58%	0.19%	0.77%	4.03%	0.00%	0.19%	1.92%
Lower-Middle Quintile	312	0.14%	74.68%	1.92%	14.42%	2.24%	1.92%	0.32%	1.60%	4.81%	0.00%	0.00%	1.92%
Lower Quintile	1,250	0.55%	78.40%	2.24%	14.40%	1.52%	1.20%	0.16%	0.96%	3.52%	0.00%	0.08%	2.40%

Table I99. Dual Status Statistics for o2v BiLSTM Predictions on the 12-Month feature space in the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Super Utilizer	226,094	97.25%	79.39%	2.45%	13.50%	1.38%	0.91%	0.07%	0.77%	3.56%	0.02%	0.03%	1.92%
Super Utilizer	1,251	2.75%	80.02%	2.08%	13.03%	1.44%	0.80%	0.00%	0.72%	3.76%	0.08%	0.08%	1.84%

Table I100. Dual Status Statistics for o2v BiLSTM Predictions on the 12-Month feature space by Quintile Within the Upper Quintile

Prediction	# Members Predicted	% Members Predicted	Dual Non Medicaid	Dual QMB	Dual Medicaid & Drugs	Dual SMLB	Dual SLMB Medicaid & Drugs	Dual QDWI	Dual QI	Dual Other Dual Medicaid & Drugs	Dual Drug Eligibility Without Medicaid	Dual Unknown	Dual Multiple
Not Predicted	226,094	97.25%	79.39%	2.45%	13.50%	1.38%	0.91%	0.07%	0.77%	3.56%	0.02%	0.03%	1.92%
Upper Quintile	626	1.37%	79.39%	2.72%	13.10%	1.76%	0.80%	0.00%	0.80%	3.67%	0.00%	0.16%	2.24%
Upper-Middle Quintile	208	0.46%	79.33%	0.96%	14.42%	1.92%	0.96%	0.00%	0.48%	3.37%	0.48%	0.00%	1.92%
Middle Quintile	105	0.23%	83.81%	0.00%	11.43%	0.00%	0.95%	0.00%	0.95%	3.81%	0.00%	0.00%	0.95%
Lower-Middle Quintile	62	0.14%	77.42%	0.00%	19.35%	0.00%	1.61%	0.00%	0.00%	3.23%	0.00%	0.00%	1.61%

Lower Quintile	250	0.55%	81.20%	2.80%	10.80%	1.20%	0.40%	0.00%	0.80%	4.40%	0.00%	0.00%	1.20%
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Emergency Department Events

Ground Truth

Data As a Decomposition of Time

Table I101. 6-Month Feature Space Ground Truth Emergency Department Event Clinical Classifications Software (CCS)			
Clinical Classification Software (CCS) Description	# ER Events	% ER Events	Cumulative Feature Importance
Essential hypertension	20,609	7.18%	7.18%
Other aftercare	19,114	6.66%	13.84%
Disorders of lipid metabolism	9,271	3.23%	17.07%
Residual codes; unclassified	8,896	3.10%	20.17%
Diabetes mellitus without complication	8,074	2.81%	22.98%
Other lower respiratory disease	7,027	2.45%	25.43%
Other connective tissue disease	6,843	2.38%	27.81%
Cardiac dysrhythmias	6,578	2.29%	30.10%
Allergic reactions	6,497	2.26%	32.36%
Nonspecific chest pain	6,090	2.12%	34.48%
Coronary atherosclerosis and other heart disease	5,912	2.06%	36.54%
Spondylosis; intervertebral disc disorders; other back problems	5,739	2.00%	38.54%
Other injuries and conditions due to external causes	5,665	1.97%	40.51%
Abdominal pain	5,406	1.88%	42.39%
Esophageal disorders	5,232	1.82%	44.21%
Other circulatory disease	5,051	1.76%	45.97%
Other nervous system disorders	4,960	1.73%	47.70%
Thyroid disorders	4,562	1.59%	49.29%
Other gastrointestinal disorders	4,520	1.57%	50.86%
Hypertension with complications and secondary hypertension	4,492	1.56%	52.42%

Other non-traumatic joint disorders	4,321	1.51%	53.93%
Urinary tract infections	4,249	1.48%	55.41%
Superficial injury; contusion	4,133	1.44%	56.85%
Congestive heart failure; nonhypertensive	3,484	1.21%	58.06%
Headache; including migraine	3,435	1.20%	59.26%
Osteoarthritis	3,399	1.18%	60.44%
Malaise and fatigue	3,398	1.18%	61.62%
Nausea and vomiting	3,232	1.13%	62.75%
Fluid and electrolyte disorders	3,177	1.11%	63.86%
Other screening for suspected conditions (not mental disorders or infectious disease)	3,164	1.10%	64.96%
Anxiety disorders	3,149	1.10%	66.06%
Diabetes mellitus with complications	3,086	1.07%	67.13%
External cause codes: Fall	3,025	1.05%	68.18%
Genitourinary symptoms and ill-defined conditions	2,977	1.04%	69.22%
Delirium dementia and amnestic and other cognitive disorders	2,971	1.03%	70.25%
Conduction disorders	2,910	1.01%	71.26%
Conditions associated with dizziness or vertigo	2,843	0.99%	72.25%
Mood disorders	2,646	0.92%	73.17%
Chronic kidney disease	2,559	0.89%	74.06%
Other nutritional; endocrine; and metabolic disorders	2,529	0.88%	74.94%
Chronic obstructive pulmonary disease and bronchiectasis	2,490	0.87%	75.81%
Asthma	2,265	0.79%	76.60%
Deficiency and other anemia	1,644	0.57%	77.17%
Syncope	1,581	0.55%	77.72%
Skin and subcutaneous tissue infections	1,552	0.54%	78.26%
Sprains and strains	1,460	0.51%	78.77%
Epilepsy; convulsions	1,439	0.50%	79.27%
Open wounds of extremities	1,408	0.49%	79.76%
Other skin disorders	1,377	0.48%	80.24%
Open wounds of head; neck; and trunk	1,363	0.47%	80.71%
Phlebitis; thrombophlebitis and thromboembolism	1,326	0.46%	81.17%
Heart valve disorders	1,231	0.43%	81.60%

Diverticulosis and diverticulitis	1,212	0.42%	82.02%
Calculus of urinary tract	1,203	0.42%	82.44%
Other diseases of kidney and ureters	1,178	0.41%	82.85%
Other upper respiratory disease	1,152	0.40%	83.25%
Pleurisy; pneumothorax; pulmonary collapse	1,112	0.39%	83.64%
External cause codes: Place of occurrence	1,112	0.39%	84.03%
Abdominal hernia	1,105	0.38%	84.41%
Other upper respiratory infections	1,093	0.38%	84.79%
Other liver diseases	987	0.34%	85.13%
Pulmonary heart disease	962	0.34%	85.47%
Other and ill-defined heart disease	960	0.33%	85.80%
Other hereditary and degenerative nervous system conditions	920	0.32%	86.12%
Other fractures	899	0.31%	86.43%
Osteoporosis	893	0.31%	86.74%
Immunizations and screening for infectious disease	885	0.31%	87.05%
Complications of surgical procedures or medical care	865	0.30%	87.35%
Hyperplasia of prostate	814	0.28%	87.63%
Peripheral and visceral atherosclerosis	746	0.26%	87.89%
Parkinson`s disease	745	0.26%	88.15%
Fracture of upper limb	726	0.25%	88.40%
Complication of device; implant or graft	719	0.25%	88.65%
External cause codes: Natural/environment	712	0.25%	88.90%
Gout and other crystal arthropathies	707	0.25%	89.15%
Bacterial infection; unspecified site	704	0.25%	89.40%
Acute and unspecified renal failure	700	0.24%	89.64%
External cause codes: Unspecified	687	0.24%	89.88%
Fever of unknown origin	687	0.24%	90.12%
Other bone disease and musculoskeletal deformities	682	0.24%	90.36%
Administrative/social admission	680	0.24%	90.60%
Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	661	0.23%	90.83%
Paralysis	640	0.22%	91.05%
Other ear and sense organ disorders	625	0.22%	91.27%

Acute cerebrovascular disease	604	0.21%	91.48%
Biliary tract disease	588	0.20%	91.68%
Developmental disorders	588	0.20%	91.88%
Rheumatoid arthritis and related disease	537	0.19%	92.07%
Noninfectious gastroenteritis	507	0.18%	92.25%
Blindness and vision defects	502	0.17%	92.42%
Other acquired deformities	482	0.17%	92.59%
Gastrointestinal hemorrhage	476	0.17%	92.76%
Other eye disorders	470	0.16%	92.92%
Other and ill-defined cerebrovascular disease	454	0.16%	93.08%
Acute bronchitis	452	0.16%	93.24%
Diseases of white blood cells	452	0.16%	93.40%
Intracranial injury	451	0.16%	93.56%
Adverse effects of medical drugs	450	0.16%	93.72%
Transient cerebral ischemia	444	0.15%	93.87%
Cancer of breast	443	0.15%	94.02%
Respiratory failure; insufficiency; arrest (adult)	440	0.15%	94.17%
Other inflammatory condition of skin	427	0.15%	94.32%
Late effects of cerebrovascular disease	414	0.14%	94.46%
Fracture of lower limb	414	0.14%	94.60%
Coagulation and hemorrhagic disorders	398	0.14%	94.74%
Peri-, endo-, and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease)	397	0.14%	94.88%
Disorders of teeth and jaw	394	0.14%	95.02%
Nutritional deficiencies	385	0.13%	95.15%
Viral infection	380	0.13%	95.28%
Glaucoma	370	0.13%	95.41%
Occlusion or stenosis of precerebral arteries	353	0.12%	95.53%
Gastritis and duodenitis	329	0.11%	95.64%
Other endocrine disorders	319	0.11%	95.75%
Chronic ulcer of skin	303	0.11%	95.86%
External cause codes: Struck by; against	299	0.10%	95.96%
Other diseases of bladder and urethra	274	0.10%	96.06%

Intestinal obstruction without hernia	270	0.09%	96.15%
Other diseases of veins and lymphatics	268	0.09%	96.24%
Systemic lupus erythematosus and connective tissue disorders	267	0.09%	96.33%
Other non-epithelial cancer of skin	263	0.09%	96.42%
Joint disorders and dislocations; trauma-related	260	0.09%	96.51%
Other and unspecified benign neoplasm	250	0.09%	96.60%
Aortic; peripheral; and visceral artery aneurysms	245	0.09%	96.69%
Acute myocardial infarction	242	0.08%	96.77%
Alcohol-related disorders	236	0.08%	96.85%
Mycoses	233	0.08%	96.93%
Pancreatic disorders (not diabetes)	228	0.08%	97.01%
Skull and face fractures	225	0.08%	97.09%
Coma; stupor; and brain damage	224	0.08%	97.17%
Other congenital anomalies	213	0.07%	97.24%
Multiple sclerosis	207	0.07%	97.31%
Other disorders of stomach and duodenum	206	0.07%	97.38%
Septicemia (except in labor)	203	0.07%	97.45%
Other female genital disorders	196	0.07%	97.52%
Medical examination/evaluation	195	0.07%	97.59%
Gastroduodenal ulcer (except hemorrhage)	186	0.06%	97.65%
Rehabilitation care; fitting of prostheses; and adjustment of devices	186	0.06%	97.71%
Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)	177	0.06%	97.77%
Cancer of colon	174	0.06%	97.83%
Regional enteritis and ulcerative colitis	171	0.06%	97.89%
Other hematologic conditions	171	0.06%	97.95%
Hemorrhoids	170	0.06%	98.01%
Other male genital disorders	165	0.06%	98.07%
Retinal detachments; defects; vascular occlusion; and retinopathy	162	0.06%	98.13%
Poisoning by non-medicinal substances	162	0.06%	98.19%
Disorders usually diagnosed in infancy childhood or adolescence	157	0.05%	98.24%
Otitis media and related conditions	156	0.05%	98.29%
Other infections; including parasitic	155	0.05%	98.34%

Intestinal infection	150	0.05%	98.39%
External cause codes: Cut/pierce	150	0.05%	98.44%
Anal and rectal conditions	138	0.05%	98.49%
Cataract	125	0.04%	98.53%
Fracture of neck of femur (hip)	122	0.04%	98.57%
Cancer of prostate	120	0.04%	98.61%
Attention-deficit conduct and disruptive behavior disorders	120	0.04%	98.65%
Diseases of mouth; excluding dental	119	0.04%	98.69%
Miscellaneous mental health disorders	118	0.04%	98.73%
External cause codes: Motor vehicle traffic (MVT)	111	0.04%	98.77%
Crushing injury or internal injury	106	0.04%	98.81%
Contraceptive and procreative management	105	0.04%	98.85%
Sickle cell anemia	104	0.04%	98.89%
Immunity disorders	103	0.04%	98.93%
Menopausal disorders	102	0.04%	98.97%
Lymphadenitis	101	0.04%	99.01%
Hepatitis	97	0.03%	99.04%
Poisoning by other medications and drugs	93	0.03%	99.07%
HIV infection	92	0.03%	99.10%
Ovarian cyst	82	0.03%	99.13%
Burns	81	0.03%	99.16%
Benign neoplasm of uterus	80	0.03%	99.19%
Varicose veins of lower extremity	79	0.03%	99.22%
Inflammatory conditions of male genital organs	75	0.03%	99.25%
Inflammatory diseases of female pelvic organs	73	0.03%	99.28%
Cancer of uterus	72	0.03%	99.31%
Infective arthritis and osteomyelitis (except that caused by tuberculosis or sexually transmitted disease)	72	0.03%	99.34%
Cancer; other and unspecified primary	70	0.02%	99.36%
Adjustment disorders	69	0.02%	99.38%
Nonmalignant breast conditions	66	0.02%	99.40%
Pathological fracture	63	0.02%	99.42%
Melanomas of skin	62	0.02%	99.44%

Acquired foot deformities	62	0.02%	99.46%
Cardiac and circulatory congenital anomalies	61	0.02%	99.48%
Nervous system congenital anomalies	58	0.02%	99.50%
Adverse effects of medical care	54	0.02%	99.52%
Acute posthemorrhagic anemia	54	0.02%	99.54%
Influenza	49	0.02%	99.56%
Cancer of kidney and renal pelvis	45	0.02%	99.58%
Aspiration pneumonitis; food/vomitus	43	0.01%	99.59%
Cancer of thyroid	39	0.01%	99.60%
Genitourinary congenital anomalies	39	0.01%	99.61%
Nephritis; nephrosis; renal sclerosis	38	0.01%	99.62%
Prolapse of female genital organs	37	0.01%	99.63%
Other CNS infection and poliomyelitis	35	0.01%	99.64%
Spinal cord injury	35	0.01%	99.65%
Cancer of cervix	34	0.01%	99.66%
Cancer of bladder	33	0.01%	99.67%
External cause codes: Other specified and classifiable	33	0.01%	99.68%
Substance-related disorders	33	0.01%	99.69%
Personality disorders	31	0.01%	99.70%
Non-Hodgkin`s lymphoma	31	0.01%	99.71%
Cancer of ovary	31	0.01%	99.72%
Neoplasms of unspecified nature or uncertain behavior	29	0.01%	99.73%
Shock	28	0.01%	99.74%
Cancer of bronchus; lung	28	0.01%	99.75%
Appendicitis and other appendiceal conditions	25	0.01%	99.76%
External cause codes: Fire/burn	24	0.01%	99.77%
Aortic and peripheral arterial embolism or thrombosis	21	0.01%	99.78%
Impulse control disorders NEC	21	0.01%	99.79%
Menstrual disorders	18	0.01%	99.80%
External cause codes: Transport; not MVT	18	0.01%	99.81%
Tuberculosis	18	0.01%	99.82%
Cardiac arrest and ventricular fibrillation	18	0.01%	99.83%

Leukemias	18	0.01%	99.84%
Lung disease due to external agents	17	0.01%	99.85%
Digestive congenital anomalies	16	0.01%	99.86%
Cancer of brain and nervous system	14	0.00%	99.86%
External cause codes: Overexertion	14	0.00%	99.86%
Cancer of head and neck	13	0.00%	99.86%
Acute and chronic tonsillitis	12	0.00%	99.86%
Sexually transmitted infections (not HIV or hepatitis)	11	0.00%	99.86%
Peritonitis and intestinal abscess	11	0.00%	99.86%
Poisoning by psychotropic agents	11	0.00%	99.86%
Cancer of other GI organs; peritoneum	11	0.00%	99.86%
External cause codes: Machinery	11	0.00%	99.86%
Hodgkin`s disease	11	0.00%	99.86%
Cystic fibrosis	10	0.00%	99.86%
External cause codes: Pedal cyclist; not MVT	9	0.00%	99.86%
Gangrene	9	0.00%	99.86%
External cause codes: Other specified; NEC	8	0.00%	99.86%
Cancer of rectum and anus	8	0.00%	99.86%
Endometriosis	7	0.00%	99.86%
Cancer of stomach	7	0.00%	99.86%
Cancer of esophagus	7	0.00%	99.86%
Secondary malignancies	6	0.00%	99.86%
Other perinatal conditions	6	0.00%	99.86%
Malignant neoplasm without specification of site	5	0.00%	99.86%
Cancer of testis	5	0.00%	99.86%
Cancer of liver and intrahepatic bile duct	3	0.00%	99.86%
External cause codes: Firearm	3	0.00%	99.86%
Cancer of other urinary organs	3	0.00%	99.86%
Cancer of other female genital organs	3	0.00%	99.86%
Meningitis (except that caused by tuberculosis or sexually transmitted disease)	2	0.00%	99.86%
Cancer; other respiratory and intrathoracic	2	0.00%	99.86%
Other pregnancy and delivery including normal	1	0.00%	99.86%

External cause codes: Pedestrian; not MVT	1	0.00%	99.86%
Hypertension complicating pregnancy; childbirth and the puerperium	1	0.00%	99.86%

Table I102. 6-Month Feature Space Ground Truth Emergency Department Event Clinical Classifications Software (CCS) for Primary Diagnosis

Clinical Classification Software (CCS) Description Principal Diagnosis	# ER Events	% ER Events	Cumulative Feature Importance
Nonspecific chest pain	4,871	6.13%	6.13%
Other lower respiratory disease	4,192	5.27%	11.40%
Other injuries and conditions due to external causes	3,924	4.93%	16.33%
Abdominal pain	3,568	4.49%	20.82%
Spondylosis; intervertebral disc disorders; other back problems	3,034	3.82%	24.64%
Superficial injury; contusion	2,880	3.62%	28.26%
Other connective tissue disease	2,730	3.43%	31.69%
Urinary tract infections	2,630	3.31%	35.00%
Other non-traumatic joint disorders	2,589	3.26%	38.26%
Cardiac dysrhythmias	1,974	2.48%	40.74%
Headache; including migraine	1,866	2.35%	43.09%
Residual codes; unclassified	1,734	2.18%	45.27%
Other gastrointestinal disorders	1,662	2.09%	47.36%
Conditions associated with dizziness or vertigo	1,574	1.98%	49.34%
Malaise and fatigue	1,490	1.87%	51.21%
Essential hypertension	1,412	1.78%	52.99%
Other nervous system disorders	1,287	1.62%	54.61%
Skin and subcutaneous tissue infections	1,241	1.56%	56.17%
Sprains and strains	1,196	1.50%	57.67%
Open wounds of extremities	1,153	1.45%	59.12%
Syncope	1,135	1.43%	60.55%
Open wounds of head; neck; and trunk	1,078	1.36%	61.91%
Genitourinary symptoms and ill-defined conditions	994	1.25%	63.16%
Fluid and electrolyte disorders	980	1.23%	64.39%
Other screening for suspected conditions (not mental disorders or infectious disease)	903	1.14%	65.53%

Nausea and vomiting	899	1.13%	66.66%
Diabetes mellitus with complications	765	0.96%	67.62%
Other fractures	706	0.89%	68.51%
Other upper respiratory infections	682	0.86%	69.37%
Other upper respiratory disease	663	0.83%	70.20%
Osteoarthritis	642	0.81%	71.01%
Fracture of upper limb	638	0.80%	71.81%
Complications of surgical procedures or medical care	636	0.80%	72.61%
Chronic obstructive pulmonary disease and bronchiectasis	629	0.79%	73.40%
Other skin disorders	621	0.78%	74.18%
Pleurisy; pneumothorax; pulmonary collapse	603	0.76%	74.94%
Other circulatory disease	586	0.74%	75.68%
Complication of device; implant or graft	581	0.73%	76.41%
Hypertension with complications and secondary hypertension	552	0.69%	77.10%
Calculus of urinary tract	549	0.69%	77.79%
Diverticulosis and diverticulitis	544	0.68%	78.47%
Epilepsy; convulsions	532	0.67%	79.14%
Congestive heart failure; nonhypertensive	457	0.57%	79.71%
Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	447	0.56%	80.27%
Other aftercare	444	0.56%	80.83%
Acute cerebrovascular disease	433	0.54%	81.37%
Allergic reactions	432	0.54%	81.91%
Other diseases of kidney and ureters	410	0.52%	82.43%
Coronary atherosclerosis and other heart disease	399	0.50%	82.93%
Transient cerebral ischemia	373	0.47%	83.40%
Noninfectious gastroenteritis	363	0.46%	83.86%
Acute bronchitis	358	0.45%	84.31%
Anxiety disorders	358	0.45%	84.76%
Asthma	350	0.44%	85.20%
Fracture of lower limb	349	0.44%	85.64%
Gastrointestinal hemorrhage	334	0.42%	86.06%
Conduction disorders	333	0.42%	86.48%
Biliary tract disease	330	0.41%	86.89%

Abdominal hernia	324	0.41%	87.30%
Delirium dementia and amnestic and other cognitive disorders	313	0.39%	87.69%
Intracranial injury	295	0.37%	88.06%
Fever of unknown origin	275	0.35%	88.41%
Other and ill-defined heart disease	270	0.34%	88.75%
Disorders of teeth and jaw	268	0.34%	89.09%
Esophageal disorders	239	0.30%	89.39%
Viral infection	231	0.29%	89.68%
Gout and other crystal arthropathies	217	0.27%	89.95%
Deficiency and other anemia	213	0.27%	90.22%
Intestinal obstruction without hernia	207	0.26%	90.48%
Phlebitis; thrombophlebitis and thromboembolism	201	0.25%	90.73%
Joint disorders and dislocations; trauma-related	193	0.24%	90.97%
Other liver diseases	192	0.24%	91.21%
Gastritis and duodenitis	188	0.24%	91.45%
Acute and unspecified renal failure	182	0.23%	91.68%
Skull and face fractures	178	0.22%	91.90%
Other ear and sense organ disorders	175	0.22%	92.12%
Acute myocardial infarction	175	0.22%	92.34%
Administrative/social admission	168	0.21%	92.55%
Other and ill-defined cerebrovascular disease	159	0.20%	92.75%
Heart valve disorders	157	0.20%	92.95%
Other eye disorders	157	0.20%	93.15%
Diabetes mellitus without complication	156	0.20%	93.35%
Septicemia (except in labor)	153	0.19%	93.54%
Other hereditary and degenerative nervous system conditions	150	0.19%	93.73%
Medical examination/evaluation	144	0.18%	93.91%
Poisoning by non-medicinal substances	135	0.17%	94.08%
Rehabilitation care; fitting of prostheses; and adjustment of devices	130	0.16%	94.24%
Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)	120	0.15%	94.39%
Blindness and vision defects	119	0.15%	94.54%
Intestinal infection	118	0.15%	94.69%
Occlusion or stenosis of precerebral arteries	113	0.14%	94.83%

Other nutritional; endocrine; and metabolic disorders	112	0.14%	94.97%
Otitis media and related conditions	109	0.14%	95.11%
Mycoses	108	0.14%	95.25%
Other inflammatory condition of skin	107	0.13%	95.38%
Chronic ulcer of skin	105	0.13%	95.51%
Other female genital disorders	103	0.13%	95.64%
Alcohol-related disorders	101	0.13%	95.77%
Other endocrine disorders	99	0.12%	95.89%
Fracture of neck of femur (hip)	95	0.12%	96.01%
Pulmonary heart disease	90	0.11%	96.12%
Other bone disease and musculoskeletal deformities	88	0.11%	96.23%
Hyperplasia of prostate	86	0.11%	96.34%
Immunizations and screening for infectious disease	86	0.11%	96.45%
Other male genital disorders	85	0.11%	96.56%
Anal and rectal conditions	82	0.10%	96.66%
Peripheral and visceral atherosclerosis	80	0.10%	96.76%
Pancreatic disorders (not diabetes)	80	0.10%	96.86%
Other acquired deformities	78	0.10%	96.96%
Burns	76	0.10%	97.06%
Diseases of mouth; excluding dental	76	0.10%	97.16%
Hemorrhoids	75	0.09%	97.25%
Mood disorders	74	0.09%	97.34%
Poisoning by other medications and drugs	71	0.09%	97.43%
Other diseases of veins and lymphatics	70	0.09%	97.52%
Crushing injury or internal injury	70	0.09%	97.61%
Respiratory failure; insufficiency; arrest (adult)	69	0.09%	97.70%
Adverse effects of medical drugs	67	0.08%	97.78%
Aortic; peripheral; and visceral artery aneurysms	65	0.08%	97.86%
Chronic kidney disease	65	0.08%	97.94%
Sickle cell anemia	64	0.08%	98.02%
Inflammatory conditions of male genital organs	55	0.07%	98.09%
Inflammatory diseases of female pelvic organs	53	0.07%	98.16%
Coagulation and hemorrhagic disorders	52	0.07%	98.23%

Paralysis	52	0.07%	98.30%
Other diseases of bladder and urethra	52	0.07%	98.37%
Coma; stupor; and brain damage	51	0.06%	98.43%
Other disorders of stomach and duodenum	50	0.06%	98.49%
Thyroid disorders	49	0.06%	98.55%
Ovarian cyst	47	0.06%	98.61%
Diseases of white blood cells	46	0.06%	98.67%
Peri-; endo-; and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease)	46	0.06%	98.73%
Varicose veins of lower extremity	45	0.06%	98.79%
Parkinson`s disease	44	0.06%	98.85%
Miscellaneous mental health disorders	42	0.05%	98.90%
Influenza	41	0.05%	98.95%
Other and unspecified benign neoplasm	39	0.05%	99.00%
Regional enteritis and ulcerative colitis	37	0.05%	99.05%
Nonmalignant breast conditions	36	0.05%	99.10%
Lymphadenitis	33	0.04%	99.14%
Late effects of cerebrovascular disease	33	0.04%	99.18%
Rheumatoid arthritis and related disease	33	0.04%	99.22%
Benign neoplasm of uterus	32	0.04%	99.26%
Other infections; including parasitic	32	0.04%	99.30%
Infective arthritis and osteomyelitis (except that caused by tuberculosis or sexually transmitted disease)	32	0.04%	99.34%
Pathological fracture	30	0.04%	99.38%
Bacterial infection; unspecified site	28	0.04%	99.42%
Disorders of lipid metabolism	27	0.03%	99.45%
Aspiration pneumonitis; food/vomit	26	0.03%	99.48%
Gastroduodenal ulcer (except hemorrhage)	24	0.03%	99.51%
Attention-deficit conduct and disruptive behavior disorders	22	0.03%	99.54%
Appendicitis and other appendiceal conditions	22	0.03%	99.57%
Multiple sclerosis	20	0.03%	99.60%
Nutritional deficiencies	20	0.03%	99.63%
Adjustment disorders	19	0.02%	99.65%
Acute posthemorrhagic anemia	18	0.02%	99.67%
Systemic lupus erythematosus and connective tissue disorders	18	0.02%	99.69%

Prolapse of female genital organs	17	0.02%	99.71%
Menopausal disorders	14	0.02%	99.73%
Aortic and peripheral arterial embolism or thrombosis	14	0.02%	99.75%
Retinal detachments; defects; vascular occlusion; and retinopathy	13	0.02%	99.77%
Developmental disorders	13	0.02%	99.79%
Glaucoma	13	0.02%	99.81%
Menstrual disorders	11	0.01%	99.82%
Other hematologic conditions	10	0.01%	99.83%
Spinal cord injury	9	0.01%	99.84%
Nephritis; nephrosis; renal sclerosis	9	0.01%	99.85%
Osteoporosis	9	0.01%	99.86%
Cardiac arrest and ventricular fibrillation	9	0.01%	99.87%
Other congenital anomalies	9	0.01%	99.88%
Poisoning by psychotropic agents	8	0.01%	99.89%
Immunity disorders	8	0.01%	99.90%
Disorders usually diagnosed in infancy childhood or adolescence	8	0.01%	99.91%
Peritonitis and intestinal abscess	8	0.01%	99.92%
Acquired foot deformities	8	0.01%	99.93%
Personality disorders	7	0.01%	99.94%
Cardiac and circulatory congenital anomalies	7	0.01%	99.95%
Sexually transmitted infections (not HIV or hepatitis)	7	0.01%	99.96%
Acute and chronic tonsillitis	6	0.01%	99.97%
Shock	6	0.01%	99.98%
Digestive congenital anomalies	5	0.01%	99.99%
Lung disease due to external agents	5	0.01%	100.00%
Gangrene	4	0.01%	100.00%
Hepatitis	4	0.01%	100.00%
Impulse control disorders NEC	3	0.00%	100.00%
Cataract	3	0.00%	100.00%
Genitourinary congenital anomalies	3	0.00%	100.00%
Other CNS infection and poliomyelitis	3	0.00%	100.00%
Substance-related disorders	3	0.00%	100.00%
Cystic fibrosis	3	0.00%	100.00%

Meningitis (except that caused by tuberculosis or sexually transmitted disease)	2	0.00%	100.00%
Other perinatal conditions	2	0.00%	100.00%
Endometriosis	1	0.00%	100.00%
Tuberculosis	1	0.00%	100.00%
HIV infection	1	0.00%	100.00%
Nervous system congenital anomalies	1	0.00%	100.00%

Data As a Decomposition of Population

Table I103. 12-Month Feature Space Ground Truth Emergency Department Event Clinical Classifications Software (CCS)			
Clinical Classification Software (CCS) Description	# ER Events	% ER Events	Cumulative Feature Importance
Essential hypertension	5,535	7.22%	7.22%
Other aftercare	5,024	6.55%	13.77%
Disorders of lipid metabolism	2,425	3.16%	16.93%
Residual codes; unclassified	2,325	3.03%	19.96%
Diabetes mellitus without complication	2,067	2.70%	22.66%
Other lower respiratory disease	1,905	2.48%	25.14%
Cardiac dysrhythmias	1,800	2.35%	27.49%
Other connective tissue disease	1,797	2.34%	29.83%
Allergic reactions	1,668	2.17%	32.00%
Nonspecific chest pain	1,613	2.10%	34.10%
Coronary atherosclerosis and other heart disease	1,592	2.08%	36.18%
Spondylosis; intervertebral disc disorders; other back problems	1,525	1.99%	38.17%
Other injuries and conditions due to external causes	1,488	1.94%	40.11%
Abdominal pain	1,482	1.93%	42.04%
Esophageal disorders	1,339	1.75%	43.79%
Other circulatory disease	1,328	1.73%	45.52%
Other nervous system disorders	1,307	1.70%	47.22%
Other gastrointestinal disorders	1,261	1.64%	48.86%
Hypertension with complications and secondary hypertension	1,246	1.62%	50.48%
Thyroid disorders	1,155	1.51%	51.99%
Other non-traumatic joint disorders	1,132	1.48%	53.47%

Superficial injury; contusion	1,117	1.46%	54.93%
Urinary tract infections	1,114	1.45%	56.38%
Malaise and fatigue	962	1.25%	57.63%
Congestive heart failure; nonhypertensive	932	1.22%	58.85%
Headache; including migraine	916	1.19%	60.04%
Osteoarthritis	907	1.18%	61.22%
Diabetes mellitus with complications	893	1.16%	62.38%
Fluid and electrolyte disorders	862	1.12%	63.50%
Other screening for suspected conditions (not mental disorders or infectious disease)	850	1.11%	64.61%
Nausea and vomiting	843	1.10%	65.71%
Delirium dementia and amnestic and other cognitive disorders	816	1.06%	66.77%
Genitourinary symptoms and ill-defined conditions	813	1.06%	67.83%
Anxiety disorders	813	1.06%	68.89%
Conduction disorders	813	1.06%	69.95%
External cause codes: Fall	783	1.02%	70.97%
Conditions associated with dizziness or vertigo	768	1.00%	71.97%
Chronic kidney disease	757	0.99%	72.96%
Mood disorders	716	0.93%	73.89%
Other nutritional; endocrine; and metabolic disorders	712	0.93%	74.82%
Chronic obstructive pulmonary disease and bronchiectasis	684	0.89%	75.71%
Asthma	568	0.74%	76.45%
Skin and subcutaneous tissue infections	432	0.56%	77.01%
Deficiency and other anemia	410	0.53%	77.54%
Syncope	409	0.53%	78.07%
Open wounds of head; neck; and trunk	398	0.52%	78.59%
Other skin disorders	390	0.51%	79.10%
Open wounds of extremities	376	0.49%	79.59%
Epilepsy; convulsions	371	0.48%	80.07%
Calculus of urinary tract	359	0.47%	80.54%
Sprains and strains	359	0.47%	81.01%
Heart valve disorders	338	0.44%	81.45%
Other upper respiratory disease	331	0.43%	81.88%
Phlebitis; thrombophlebitis and thromboembolism	329	0.43%	82.31%

Other diseases of kidney and ureters	327	0.43%	82.74%
Diverticulosis and diverticulitis	317	0.41%	83.15%
Pleurisy; pneumothorax; pulmonary collapse	312	0.41%	83.56%
Other upper respiratory infections	297	0.39%	83.95%
Abdominal hernia	291	0.38%	84.33%
External cause codes: Place of occurrence	287	0.37%	84.70%
Other liver diseases	269	0.35%	85.05%
Other hereditary and degenerative nervous system conditions	254	0.33%	85.38%
Pulmonary heart disease	253	0.33%	85.71%
Other and ill-defined heart disease	247	0.32%	86.03%
Osteoporosis	241	0.31%	86.34%
Complications of surgical procedures or medical care	239	0.31%	86.65%
Immunizations and screening for infectious disease	226	0.29%	86.94%
Other fractures	223	0.29%	87.23%
Gout and other crystal arthropathies	204	0.27%	87.50%
Other bone disease and musculoskeletal deformities	203	0.26%	87.76%
Fever of unknown origin	202	0.26%	88.02%
External cause codes: Natural/environment	199	0.26%	88.28%
Bacterial infection; unspecified site	198	0.26%	88.54%
Paralysis	195	0.25%	88.79%
Hyperplasia of prostate	195	0.25%	89.04%
Parkinson`s disease	194	0.25%	89.29%
Administrative/social admission	193	0.25%	89.54%
Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	192	0.25%	89.79%
Fracture of upper limb	191	0.25%	90.04%
Acute and unspecified renal failure	186	0.24%	90.28%
Developmental disorders	183	0.24%	90.52%
Peripheral and visceral atherosclerosis	181	0.24%	90.76%
Complication of device; implant or graft	179	0.23%	90.99%
External cause codes: Unspecified	173	0.23%	91.22%
Other ear and sense organ disorders	170	0.22%	91.44%
Acute cerebrovascular disease	161	0.21%	91.65%
Rheumatoid arthritis and related disease	156	0.20%	91.85%

Biliary tract disease	155	0.20%	92.05%
Other acquired deformities	150	0.20%	92.25%
Noninfectious gastroenteritis	140	0.18%	92.43%
Blindness and vision defects	135	0.18%	92.61%
Respiratory failure; insufficiency; arrest (adult)	133	0.17%	92.78%
Acute bronchitis	129	0.17%	92.95%
Other inflammatory condition of skin	129	0.17%	93.12%
Other eye disorders	126	0.16%	93.28%
Transient cerebral ischemia	124	0.16%	93.44%
Cancer of breast	119	0.16%	93.60%
Intracranial injury	118	0.15%	93.75%
Gastrointestinal hemorrhage	116	0.15%	93.90%
Disorders of teeth and jaw	115	0.15%	94.05%
Other and ill-defined cerebrovascular disease	114	0.15%	94.20%
Adverse effects of medical drugs	113	0.15%	94.35%
Fracture of lower limb	111	0.14%	94.49%
Nutritional deficiencies	109	0.14%	94.63%
Glaucoma	107	0.14%	94.77%
Diseases of white blood cells	106	0.14%	94.91%
Peri-, endo-, and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease)	106	0.14%	95.05%
Coagulation and hemorrhagic disorders	99	0.13%	95.18%
Occlusion or stenosis of precerebral arteries	93	0.12%	95.30%
Viral infection	88	0.11%	95.41%
Chronic ulcer of skin	88	0.11%	95.52%
Other endocrine disorders	87	0.11%	95.63%
External cause codes: Struck by; against	86	0.11%	95.74%
Late effects of cerebrovascular disease	86	0.11%	95.85%
Intestinal obstruction without hernia	83	0.11%	95.96%
Gastritis and duodenitis	80	0.10%	96.06%
Other congenital anomalies	79	0.10%	96.16%
Medical examination/evaluation	75	0.10%	96.26%
Joint disorders and dislocations; trauma-related	72	0.09%	96.35%
Other diseases of veins and lymphatics	71	0.09%	96.44%

Aortic; peripheral; and visceral artery aneurysms	71	0.09%	96.53%
Mycoses	70	0.09%	96.62%
Acute myocardial infarction	68	0.09%	96.71%
Other diseases of bladder and urethra	68	0.09%	96.80%
Other non-epithelial cancer of skin	63	0.08%	96.88%
Systemic lupus erythematosus and connective tissue disorders	60	0.08%	96.96%
Alcohol-related disorders	60	0.08%	97.04%
Rehabilitation care; fitting of prostheses; and adjustment of devices	58	0.08%	97.12%
Coma; stupor; and brain damage	54	0.07%	97.19%
Other disorders of stomach and duodenum	53	0.07%	97.26%
Other and unspecified benign neoplasm	53	0.07%	97.33%
Septicemia (except in labor)	52	0.07%	97.40%
Poisoning by nonmedicinal substances	52	0.07%	97.47%
Other hematologic conditions	52	0.07%	97.54%
Skull and face fractures	50	0.07%	97.61%
Disorders usually diagnosed in infancy childhood or adolescence	50	0.07%	97.68%
Otitis media and related conditions	49	0.06%	97.74%
Multiple sclerosis	48	0.06%	97.80%
Regional enteritis and ulcerative colitis	48	0.06%	97.86%
Pancreatic disorders (not diabetes)	47	0.06%	97.92%
Other infections; including parasitic	47	0.06%	97.98%
Other female genital disorders	46	0.06%	98.04%
Gastroduodenal ulcer (except hemorrhage)	45	0.06%	98.10%
Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)	45	0.06%	98.16%
Retinal detachments; defects; vascular occlusion; and retinopathy	43	0.06%	98.22%
Hemorrhoids	42	0.05%	98.27%
Cancer of colon	42	0.05%	98.32%
External cause codes: Cut/pierce	40	0.05%	98.37%
Attention-deficit conduct and disruptive behavior disorders	39	0.05%	98.42%
Cataract	39	0.05%	98.47%
Anal and rectal conditions	38	0.05%	98.52%
Other male genital disorders	38	0.05%	98.57%
Fracture of neck of femur (hip)	37	0.05%	98.62%

Contraceptive and procreative management	31	0.04%	98.66%
Cancer of prostate	31	0.04%	98.70%
Intestinal infection	31	0.04%	98.74%
Crushing injury or internal injury	29	0.04%	98.78%
External cause codes: Motor vehicle traffic (MVT)	29	0.04%	98.82%
Diseases of mouth; excluding dental	28	0.04%	98.86%
Hepatitis	26	0.03%	98.89%
Ovarian cyst	26	0.03%	98.92%
Burns	26	0.03%	98.95%
Infective arthritis and osteomyelitis (except that caused by tuberculosis or sexually transmitted disease)	26	0.03%	98.98%
Miscellaneous mental health disorders	26	0.03%	99.01%
Menopausal disorders	26	0.03%	99.04%
Lymphadenitis	24	0.03%	99.07%
HIV infection	23	0.03%	99.10%
Benign neoplasm of uterus	23	0.03%	99.13%
Inflammatory diseases of female pelvic organs	22	0.03%	99.16%
Sickle cell anemia	22	0.03%	99.19%
Immunity disorders	22	0.03%	99.22%
Poisoning by other medications and drugs	21	0.03%	99.25%
Cardiac and circulatory congenital anomalies	20	0.03%	99.28%
Varicose veins of lower extremity	20	0.03%	99.31%
Nonmalignant breast conditions	19	0.02%	99.33%
Inflammatory conditions of male genital organs	19	0.02%	99.35%
Adjustment disorders	18	0.02%	99.37%
Acute posthemorrhagic anemia	18	0.02%	99.39%
Pathological fracture	17	0.02%	99.41%
Cancer of thyroid	16	0.02%	99.43%
Cancer of uterus	16	0.02%	99.45%
Cancer; other and unspecified primary	16	0.02%	99.47%
Acquired foot deformities	14	0.02%	99.49%
Nervous system congenital anomalies	13	0.02%	99.51%
Adverse effects of medical care	12	0.02%	99.53%
Nephritis; nephrosis; renal sclerosis	11	0.01%	99.54%

Prolapse of female genital organs	11	0.01%	99.55%
Cancer of bladder	11	0.01%	99.56%
Neoplasms of unspecified nature or uncertain behavior	11	0.01%	99.57%
Influenza	11	0.01%	99.58%
Genitourinary congenital anomalies	10	0.01%	99.59%
Aspiration pneumonitis; food/vomitus	10	0.01%	99.60%
Appendicitis and other appendiceal conditions	10	0.01%	99.61%
Cancer of ovary	10	0.01%	99.62%
Impulse control disorders NEC	10	0.01%	99.63%
Other CNS infection and poliomyelitis	10	0.01%	99.64%
Cancer of kidney and renal pelvis	9	0.01%	99.65%
Melanomas of skin	8	0.01%	99.66%
Aortic and peripheral arterial embolism or thrombosis	8	0.01%	99.67%
External cause codes: Other specified and classifiable	8	0.01%	99.68%
Non-Hodgkin`s lymphoma	7	0.01%	99.69%
Personality disorders	7	0.01%	99.70%
Shock	7	0.01%	99.71%
Cancer of cervix	6	0.01%	99.72%
Cancer of brain and nervous system	6	0.01%	99.73%
Leukemias	6	0.01%	99.74%
Tuberculosis	6	0.01%	99.75%
Substance-related disorders	6	0.01%	99.76%
Spinal cord injury	6	0.01%	99.77%
Lung disease due to external agents	5	0.01%	99.78%
Gangrene	5	0.01%	99.79%
External cause codes: Transport; not MVT	5	0.01%	99.80%
External cause codes: Overexertion	5	0.01%	99.81%
External cause codes: Fire/burn	5	0.01%	99.82%
Cancer of head and neck	4	0.01%	99.83%
Cardiac arrest and ventricular fibrillation	4	0.01%	99.84%
Cancer of other GI organs; peritoneum	4	0.01%	99.85%
External cause codes: Other specified; NEC	4	0.01%	99.86%
Menstrual disorders	4	0.01%	99.87%

Cancer of bronchus; lung	3	0.00%	99.87%
Digestive congenital anomalies	3	0.00%	99.87%
Poisoning by psychotropic agents	3	0.00%	99.87%
Malignant neoplasm without specification of site	2	0.00%	99.87%
Cancer of esophagus	2	0.00%	99.87%
Secondary malignancies	2	0.00%	99.87%
Other perinatal conditions	2	0.00%	99.87%
Hodgkin`s disease	2	0.00%	99.87%
Peritonitis and intestinal abscess	2	0.00%	99.87%
Acute and chronic tonsillitis	2	0.00%	99.87%
Cancer of testis	2	0.00%	99.87%
Endometriosis	1	0.00%	99.87%
Meningitis (except that caused by tuberculosis or sexually transmitted disease)	1	0.00%	99.87%
External cause codes: Firearm	1	0.00%	99.87%
External cause codes: Pedestrian; not MVT	1	0.00%	99.87%
Cancer of other urinary organs	1	0.00%	99.87%
Cancer of stomach	1	0.00%	99.87%
Cancer of other female genital organs	1	0.00%	99.87%
Cystic fibrosis	1	0.00%	99.87%
Cancer of rectum and anus	1	0.00%	99.87%
External cause codes: Machinery	1	0.00%	99.87%

Table I104. 12-Month Feature Space Ground Truth Emergency Department Event Clinical Classifications Software (CCS) for Primary Diagnosis			
Clinical Classification Software (CCS) Description Principal Diagnosis	# ER Events	% ER Events	Cumulative Feature Importance
Nonspecific chest pain	1,267	5.90%	5.90%
Other lower respiratory disease	1,137	5.29%	11.19%
Other injuries and conditions due to external causes	1,024	4.77%	15.96%
Abdominal pain	980	4.56%	20.52%
Spondylosis; intervertebral disc disorders; other back problems	808	3.76%	24.28%
Superficial injury; contusion	792	3.69%	27.97%
Other connective tissue disease	741	3.45%	31.42%

Urinary tract infections	684	3.18%	34.60%
Other non-traumatic joint disorders	665	3.10%	37.70%
Cardiac dysrhythmias	550	2.56%	40.26%
Other gastrointestinal disorders	492	2.29%	42.55%
Headache; including migraine	489	2.28%	44.83%
Residual codes; unclassified	462	2.15%	46.98%
Conditions associated with dizziness or vertigo	444	2.07%	49.05%
Malaise and fatigue	440	2.05%	51.10%
Essential hypertension	385	1.79%	52.89%
Skin and subcutaneous tissue infections	342	1.59%	54.48%
Other nervous system disorders	339	1.58%	56.06%
Open wounds of head; neck; and trunk	326	1.52%	57.58%
Sprains and strains	310	1.44%	59.02%
Open wounds of extremities	309	1.44%	60.46%
Syncope	307	1.43%	61.89%
Fluid and electrolyte disorders	272	1.27%	63.16%
Genitourinary symptoms and ill-defined conditions	255	1.19%	64.35%
Other screening for suspected conditions (not mental disorders or infectious disease)	228	1.06%	65.41%
Nausea and vomiting	215	1.00%	66.41%
Diabetes mellitus with complications	215	1.00%	67.41%
Other upper respiratory disease	194	0.90%	68.31%
Other upper respiratory infections	187	0.87%	69.18%
Other skin disorders	181	0.84%	70.02%
Osteoarthritis	179	0.83%	70.85%
Other fractures	178	0.83%	71.68%
Fracture of upper limb	175	0.81%	72.49%
Chronic obstructive pulmonary disease and bronchiectasis	174	0.81%	73.30%
Complications of surgical procedures or medical care	173	0.81%	74.11%
Pleurisy; pneumothorax; pulmonary collapse	166	0.77%	74.88%
Calculus of urinary tract	165	0.77%	75.65%
Other circulatory disease	165	0.77%	76.42%
Hypertension with complications and secondary hypertension	152	0.71%	77.13%
Complication of device; implant or graft	151	0.70%	77.83%

Epilepsy; convulsions	141	0.66%	78.49%
Other diseases of kidney and ureters	131	0.61%	79.10%
Diverticulosis and diverticulitis	129	0.60%	79.70%
Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	129	0.60%	80.30%
Other aftercare	128	0.60%	80.90%
Congestive heart failure; nonhypertensive	128	0.60%	81.50%
Acute cerebrovascular disease	117	0.54%	82.04%
Allergic reactions	115	0.54%	82.58%
Transient cerebral ischemia	107	0.50%	83.08%
Coronary atherosclerosis and other heart disease	102	0.47%	83.55%
Noninfectious gastroenteritis	101	0.47%	84.02%
Acute bronchitis	100	0.47%	84.49%
Fracture of lower limb	99	0.46%	84.95%
Abdominal hernia	93	0.43%	85.38%
Asthma	91	0.42%	85.80%
Biliary tract disease	88	0.41%	86.21%
Conduction disorders	87	0.41%	86.62%
Disorders of teeth and jaw	86	0.40%	87.02%
Gastrointestinal hemorrhage	79	0.37%	87.39%
Anxiety disorders	79	0.37%	87.76%
Fever of unknown origin	79	0.37%	88.13%
Delirium dementia and amnestic and other cognitive disorders	75	0.35%	88.48%
Esophageal disorders	72	0.34%	88.82%
Intracranial injury	72	0.34%	89.16%
Other and ill-defined heart disease	71	0.33%	89.49%
Intestinal obstruction without hernia	68	0.32%	89.81%
Medical examination/evaluation	62	0.29%	90.10%
Other liver diseases	60	0.28%	90.38%
Acute and unspecified renal failure	60	0.28%	90.66%
Joint disorders and dislocations; trauma-related	59	0.27%	90.93%
Viral infection	57	0.27%	91.20%
Gout and other crystal arthropathies	54	0.25%	91.45%
Other ear and sense organ disorders	53	0.25%	91.70%

Acute myocardial infarction	51	0.24%	91.94%
Administrative/social admission	50	0.23%	92.17%
Deficiency and other anemia	49	0.23%	92.40%
Phlebitis; thrombophlebitis and thromboembolism	48	0.22%	92.62%
Poisoning by non-medicinal substances	43	0.20%	92.82%
Gastritis and duodenitis	42	0.20%	93.02%
Skull and face fractures	41	0.19%	93.21%
Diabetes mellitus without complication	41	0.19%	93.40%
Other eye disorders	41	0.19%	93.59%
Other and ill-defined cerebrovascular disease	36	0.17%	93.76%
Occlusion or stenosis of precerebral arteries	36	0.17%	93.93%
Rehabilitation care; fitting of prostheses; and adjustment of devices	35	0.16%	94.09%
Septicemia (except in labor)	35	0.16%	94.25%
Other hereditary and degenerative nervous system conditions	35	0.16%	94.41%
Heart valve disorders	34	0.16%	94.57%
Otitis media and related conditions	33	0.15%	94.72%
Mycoses	33	0.15%	94.87%
Blindness and vision defects	33	0.15%	95.02%
Other female genital disorders	31	0.14%	95.16%
Other inflammatory condition of skin	30	0.14%	95.30%
Other nutritional; endocrine; and metabolic disorders	30	0.14%	95.44%
Other bone disease and musculoskeletal deformities	28	0.13%	95.57%
Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)	28	0.13%	95.70%
Chronic ulcer of skin	27	0.13%	95.83%
Other acquired deformities	27	0.13%	95.96%
Fracture of neck of femur (hip)	27	0.13%	96.09%
Alcohol-related disorders	27	0.13%	96.22%
Other endocrine disorders	26	0.12%	96.34%
Peripheral and visceral atherosclerosis	26	0.12%	96.46%
Burns	25	0.12%	96.58%
Aortic; peripheral; and visceral artery aneurysms	24	0.11%	96.69%
Intestinal infection	24	0.11%	96.80%
Anal and rectal conditions	23	0.11%	96.91%

Other diseases of veins and lymphatics	21	0.10%	97.01%
Chronic kidney disease	21	0.10%	97.11%
Other male genital disorders	21	0.10%	97.21%
Hyperplasia of prostate	21	0.10%	97.31%
Pulmonary heart disease	20	0.09%	97.40%
Respiratory failure; insufficiency; arrest (adult)	20	0.09%	97.49%
Mood disorders	20	0.09%	97.58%
Crushing injury or internal injury	19	0.09%	97.67%
Thyroid disorders	19	0.09%	97.76%
Poisoning by other medications and drugs	18	0.08%	97.84%
Hemorrhoids	17	0.08%	97.92%
Paralysis	17	0.08%	98.00%
Adverse effects of medical drugs	16	0.07%	98.07%
Diseases of white blood cells	16	0.07%	98.14%
Pancreatic disorders (not diabetes)	16	0.07%	98.21%
Ovarian cyst	15	0.07%	98.28%
Inflammatory diseases of female pelvic organs	15	0.07%	98.35%
Diseases of mouth; excluding dental	14	0.07%	98.42%
Varicose veins of lower extremity	14	0.07%	98.49%
Coma; stupor; and brain damage	14	0.07%	98.56%
Coagulation and hemorrhagic disorders	13	0.06%	98.62%
Other disorders of stomach and duodenum	12	0.06%	98.68%
Immunizations and screening for infectious disease	12	0.06%	98.74%
Inflammatory conditions of male genital organs	12	0.06%	98.80%
Benign neoplasm of uterus	11	0.05%	98.85%
Peri-; endo-; and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease)	10	0.05%	98.90%
Regional enteritis and ulcerative colitis	10	0.05%	98.95%
Appendicitis and other appendiceal conditions	10	0.05%	99.00%
Other diseases of bladder and urethra	10	0.05%	99.05%
Miscellaneous mental health disorders	9	0.04%	99.09%
Other infections; including parasitic	9	0.04%	99.13%
Other and unspecified benign neoplasm	9	0.04%	99.17%
Infective arthritis and osteomyelitis (except that caused by tuberculosis or sexually transmitted disease)	9	0.04%	99.21%

Nonmalignant breast conditions	9	0.04%	99.25%
Influenza	9	0.04%	99.29%
Rheumatoid arthritis and related disease	8	0.04%	99.33%
Pathological fracture	8	0.04%	99.37%
Sickle cell anemia	8	0.04%	99.41%
Attention-deficit conduct and disruptive behavior disorders	7	0.03%	99.44%
Parkinson`s disease	7	0.03%	99.47%
Nutritional deficiencies	7	0.03%	99.50%
Disorders usually diagnosed in infancy childhood or adolescence	6	0.03%	99.53%
Late effects of cerebrovascular disease	6	0.03%	99.56%
Bacterial infection; unspecified site	6	0.03%	99.59%
Aortic and peripheral arterial embolism or thrombosis	5	0.02%	99.61%
Lymphadenitis	5	0.02%	99.63%
Multiple sclerosis	5	0.02%	99.65%
Adjustment disorders	5	0.02%	99.67%
Disorders of lipid metabolism	5	0.02%	99.69%
Gastroduodenal ulcer (except hemorrhage)	4	0.02%	99.71%
Cardiac and circulatory congenital anomalies	4	0.02%	99.73%
Aspiration pneumonitis; food/vomitus	4	0.02%	99.75%
Developmental disorders	4	0.02%	99.77%
Prolapse of female genital organs	4	0.02%	99.79%
Cardiac arrest and ventricular fibrillation	3	0.01%	99.80%
Glaucoma	3	0.01%	99.81%
Other congenital anomalies	3	0.01%	99.82%
Retinal detachments; defects; vascular occlusion; and retinopathy	3	0.01%	99.83%
Acute posthemorrhagic anemia	3	0.01%	99.84%
Shock	3	0.01%	99.85%
Osteoporosis	2	0.01%	99.86%
Menopausal disorders	2	0.01%	99.87%
Menstrual disorders	2	0.01%	99.88%
Gangrene	2	0.01%	99.89%
Lung disease due to external agents	2	0.01%	99.90%
Peritonitis and intestinal abscess	2	0.01%	99.91%

Nephritis; nephrosis; renal sclerosis	2	0.01%	99.92%
Hepatitis	2	0.01%	99.93%
Spinal cord injury	2	0.01%	99.94%
Other hematologic conditions	2	0.01%	99.95%
Systemic lupus erythematosus and connective tissue disorders	2	0.01%	99.96%
Acute and chronic tonsillitis	2	0.01%	99.97%
Acquired foot deformities	2	0.01%	99.98%
Personality disorders	1	0.00%	99.98%
Genitourinary congenital anomalies	1	0.00%	99.98%
Poisoning by psychotropic agents	1	0.00%	99.98%
Impulse control disorders NEC	1	0.00%	99.98%
Cystic fibrosis	1	0.00%	99.98%
HIV infection	1	0.00%	99.98%
Meningitis (except that caused by tuberculosis or sexually transmitted disease)	1	0.00%	99.98%
Digestive congenital anomalies	1	0.00%	99.98%
Cataract	1	0.00%	99.98%

XGBoost Predictions

Data As a Decomposition of Time

Table I105. 6-Month Feature Space XGBoost Emergency Department Event Clinical Classifications Software (CCS)

Clinical Classification Software (CCS) Description	# ER	% ER	Cumulative
	Events	Events	Feature Importance
Other aftercare	7,676	6.46%	6.46%
Essential hypertension	7,671	6.45%	12.91%
Residual codes; unclassified	3,632	3.06%	15.97%
Disorders of lipid metabolism	3,573	3.01%	18.98%
Diabetes mellitus without complication	3,462	2.91%	21.89%
Other lower respiratory disease	3,012	2.53%	24.42%
Other connective tissue disease	2,804	2.36%	26.78%

Cardiac dysrhythmias	2,797	2.35%	29.13%
Allergic reactions	2,707	2.28%	31.41%
Nonspecific chest pain	2,589	2.18%	33.59%
Coronary atherosclerosis and other heart disease	2,565	2.16%	35.75%
Esophageal disorders	2,365	1.99%	37.74%
Hypertension with complications and secondary hypertension	2,263	1.90%	39.64%
Spondylosis; intervertebral disc disorders; other back problems	2,258	1.90%	41.54%
Other injuries and conditions due to external causes	2,233	1.88%	43.42%
Other circulatory disease	2,162	1.82%	45.24%
Abdominal pain	2,141	1.80%	47.04%
Other nervous system disorders	2,091	1.76%	48.80%
Other gastrointestinal disorders	1,981	1.67%	50.47%
Congestive heart failure; nonhypertensive	1,943	1.63%	52.10%
Thyroid disorders	1,818	1.53%	53.63%
Urinary tract infections	1,785	1.50%	55.13%
Other non-traumatic joint disorders	1,739	1.46%	56.59%
Superficial injury; contusion	1,657	1.39%	57.98%
Diabetes mellitus with complications	1,492	1.26%	59.24%
Headache; including migraine	1,482	1.25%	60.49%
Conduction disorders	1,406	1.18%	61.67%
Osteoarthritis	1,394	1.17%	62.84%
Anxiety disorders	1,342	1.13%	63.97%
Delirium dementia and amnestic and other cognitive disorders	1,329	1.12%	65.09%
Nausea and vomiting	1,306	1.10%	66.19%
Chronic kidney disease	1,298	1.09%	67.28%
Fluid and electrolyte disorders	1,287	1.08%	68.36%
Malaise and fatigue	1,255	1.06%	69.42%
Other screening for suspected conditions (not mental disorders or infectious disease)	1,235	1.04%	70.46%
Chronic obstructive pulmonary disease and bronchiectasis	1,215	1.02%	71.48%
External cause codes: Fall	1,211	1.02%	72.50%
Asthma	1,178	0.99%	73.49%
Mood disorders	1,174	0.99%	74.48%

Other nutritional; endocrine; and metabolic disorders	1,149	0.97%	75.45%
Genitourinary symptoms and ill-defined conditions	1,077	0.91%	76.36%
Conditions associated with dizziness or vertigo	1,016	0.85%	77.21%
Epilepsy; convulsions	847	0.71%	77.92%
Deficiency and other anemia	770	0.65%	78.57%
Phlebitis; thrombophlebitis and thromboembolism	608	0.51%	79.08%
Syncope	588	0.49%	79.57%
Sprains and strains	566	0.48%	80.05%
Heart valve disorders	552	0.46%	80.51%
Pulmonary heart disease	520	0.44%	80.95%
Skin and subcutaneous tissue infections	509	0.43%	81.38%
Pleurisy; pneumothorax; pulmonary collapse	482	0.41%	81.79%
Other skin disorders	482	0.41%	82.20%
Open wounds of head; neck; and trunk	464	0.39%	82.59%
Other and ill-defined heart disease	460	0.39%	82.98%
External cause codes: Place of occurrence	457	0.38%	83.36%
Diverticulosis and diverticulitis	434	0.37%	83.73%
Other upper respiratory infections	433	0.36%	84.09%
Complications of surgical procedures or medical care	430	0.36%	84.45%
Open wounds of extremities	425	0.36%	84.81%
Abdominal hernia	408	0.34%	85.15%
Other liver diseases	407	0.34%	85.49%
Osteoporosis	397	0.33%	85.82%
Other diseases of kidney and ureters	392	0.33%	86.15%
Other hereditary and degenerative nervous system conditions	390	0.33%	86.48%
Other upper respiratory disease	387	0.33%	86.81%
Calculus of urinary tract	384	0.32%	87.13%
Developmental disorders	377	0.32%	87.45%
Paralysis	355	0.30%	87.75%
Complication of device; implant or graft	341	0.29%	88.04%
Peripheral and visceral atherosclerosis	332	0.28%	88.32%
Other bone disease and musculoskeletal deformities	325	0.27%	88.59%

Other fractures	322	0.27%	88.86%
Administrative/social admission	321	0.27%	89.13%
Bacterial infection; unspecified site	315	0.26%	89.39%
Parkinson`s disease	305	0.26%	89.65%
Gout and other crystal arthropathies	290	0.24%	89.89%
Rheumatoid arthritis and related disease	287	0.24%	90.13%
Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	286	0.24%	90.37%
Acute and unspecified renal failure	282	0.24%	90.61%
Immunizations and screening for infectious disease	266	0.22%	90.83%
Fever of unknown origin	266	0.22%	91.05%
External cause codes: Unspecified	265	0.22%	91.27%
Other ear and sense organ disorders	262	0.22%	91.49%
Hyperplasia of prostate	251	0.21%	91.70%
External cause codes: Natural/environment	243	0.20%	91.90%
Respiratory failure; insufficiency; arrest (adult)	235	0.20%	92.10%
Fracture of upper limb	234	0.20%	92.30%
Acute bronchitis	213	0.18%	92.48%
Late effects of cerebrovascular disease	210	0.18%	92.66%
Cancer of breast	201	0.17%	92.83%
Gastrointestinal hemorrhage	194	0.16%	92.99%
Other acquired deformities	193	0.16%	93.15%
Biliary tract disease	189	0.16%	93.31%
Blindness and vision defects	186	0.16%	93.47%
Acute cerebrovascular disease	177	0.15%	93.62%
Noninfectious gastroenteritis	176	0.15%	93.77%
Intracranial injury	170	0.14%	93.91%
Diseases of white blood cells	170	0.14%	94.05%
Peri-; endo-; and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease)	169	0.14%	94.19%
Nutritional deficiencies	167	0.14%	94.33%
Other inflammatory condition of skin	162	0.14%	94.47%
Systemic lupus erythematosus and connective tissue disorders	161	0.14%	94.61%
Other eye disorders	159	0.13%	94.74%

Glaucoma	157	0.13%	94.87%
Other and ill-defined cerebrovascular disease	157	0.13%	95.00%
Other endocrine disorders	153	0.13%	95.13%
Coagulation and hemorrhagic disorders	153	0.13%	95.26%
Transient cerebral ischemia	151	0.13%	95.39%
Adverse effects of medical drugs	150	0.13%	95.52%
Disorders of teeth and jaw	148	0.12%	95.64%
Chronic ulcer of skin	140	0.12%	95.76%
Viral infection	134	0.11%	95.87%
Fracture of lower limb	130	0.11%	95.98%
Other disorders of stomach and duodenum	129	0.11%	96.09%
Gastritis and duodenitis	127	0.11%	96.20%
External cause codes: Struck by; against	120	0.10%	96.30%
Other diseases of veins and lymphatics	119	0.10%	96.40%
Occlusion or stenosis of precerebral arteries	116	0.10%	96.50%
Other congenital anomalies	113	0.10%	96.60%
Multiple sclerosis	112	0.09%	96.69%
Mycoses	105	0.09%	96.78%
Intestinal obstruction without hernia	105	0.09%	96.87%
Rehabilitation care; fitting of prostheses; and adjustment of devices	102	0.09%	96.96%
Other diseases of bladder and urethra	96	0.08%	97.04%
Other non-epithelial cancer of skin	94	0.08%	97.12%
Regional enteritis and ulcerative colitis	94	0.08%	97.20%
Coma; stupor; and brain damage	88	0.07%	97.27%
Pancreatic disorders (not diabetes)	85	0.07%	97.34%
Septicemia (except in labor)	85	0.07%	97.41%
Other and unspecified benign neoplasm	84	0.07%	97.48%
Other female genital disorders	84	0.07%	97.55%
Disorders usually diagnosed in infancy childhood or adolescence	82	0.07%	97.62%
Acute myocardial infarction	82	0.07%	97.69%
Aortic; peripheral; and visceral artery aneurysms	80	0.07%	97.76%
Joint disorders and dislocations; trauma-related	79	0.07%	97.83%

Alcohol-related disorders	78	0.07%	97.90%
Medical examination/evaluation	77	0.06%	97.96%
Sickle cell anemia	74	0.06%	98.02%
Cancer of colon	73	0.06%	98.08%
Retinal detachments; defects; vascular occlusion; and retinopathy	70	0.06%	98.14%
Other infections; including parasitic	67	0.06%	98.20%
Skull and face fractures	67	0.06%	98.26%
Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)	66	0.06%	98.32%
HIV infection	64	0.05%	98.37%
Hemorrhoids	63	0.05%	98.42%
Attention-deficit conduct and disruptive behavior disorders	62	0.05%	98.47%
Other hematologic conditions	61	0.05%	98.52%
Gastroduodenal ulcer (except hemorrhage)	59	0.05%	98.57%
Intestinal infection	58	0.05%	98.62%
Miscellaneous mental health disorders	57	0.05%	98.67%
Immunity disorders	55	0.05%	98.72%
Hepatitis	51	0.04%	98.76%
Otitis media and related conditions	50	0.04%	98.80%
Fracture of neck of femur (hip)	47	0.04%	98.84%
External cause codes: Cut/pierce	46	0.04%	98.88%
Contraceptive and procreative management	44	0.04%	98.92%
Anal and rectal conditions	42	0.04%	98.96%
Cataract	41	0.03%	98.99%
Cancer of uterus	40	0.03%	99.02%
Poisoning by non-medicinal substances	38	0.03%	99.05%
Diseases of mouth; excluding dental	38	0.03%	99.08%
Poisoning by other medications and drugs	38	0.03%	99.11%
Menopausal disorders	37	0.03%	99.14%
External cause codes: Motor vehicle traffic (MVT)	36	0.03%	99.17%
Inflammatory diseases of female pelvic organs	36	0.03%	99.20%
Ovarian cyst	34	0.03%	99.23%
Cancer of prostate	34	0.03%	99.26%

Lymphadenitis	34	0.03%	99.29%
Infective arthritis and osteomyelitis (except that caused by tuberculosis or sexually transmitted disease)	33	0.03%	99.32%
Nervous system congenital anomalies	33	0.03%	99.35%
Cancer; other and unspecified primary	31	0.03%	99.38%
Other male genital disorders	30	0.03%	99.41%
Aspiration pneumonitis; food/vomitus	28	0.02%	99.43%
Benign neoplasm of uterus	27	0.02%	99.45%
Varicose veins of lower extremity	27	0.02%	99.47%
Crushing injury or internal injury	26	0.02%	99.49%
Nonmalignant breast conditions	26	0.02%	99.51%
Acquired foot deformities	25	0.02%	99.53%
Influenza	25	0.02%	99.55%
Pathological fracture	24	0.02%	99.57%
Cancer of cervix	24	0.02%	99.59%
Cardiac and circulatory congenital anomalies	24	0.02%	99.61%
Adjustment disorders	22	0.02%	99.63%
Inflammatory conditions of male genital organs	21	0.02%	99.65%
Cancer of kidney and renal pelvis	21	0.02%	99.67%
Cancer of ovary	19	0.02%	99.69%
Acute posthemorrhagic anemia	19	0.02%	99.71%
Personality disorders	18	0.02%	99.73%
Adverse effects of medical care	18	0.02%	99.75%
Nephritis; nephrosis; renal sclerosis	18	0.02%	99.77%
Burns	16	0.01%	99.78%
Neoplasms of unspecified nature or uncertain behavior	16	0.01%	99.79%
Genitourinary congenital anomalies	15	0.01%	99.80%
Impulse control disorders NEC	15	0.01%	99.81%
Melanomas of skin	15	0.01%	99.82%
Prolapse of female genital organs	14	0.01%	99.83%
Cancer of thyroid	13	0.01%	99.84%
Spinal cord injury	12	0.01%	99.85%
Cancer of bladder	11	0.01%	99.86%

Shock	11	0.01%	99.87%
External cause codes: Overexertion	11	0.01%	99.88%
Substance-related disorders	10	0.01%	99.89%
External cause codes: Other specified and classifiable	10	0.01%	99.90%
Other CNS infection and poliomyelitis	10	0.01%	99.91%
Non-Hodgkin`s lymphoma	10	0.01%	99.92%
Cystic fibrosis	9	0.01%	99.93%
Menstrual disorders	9	0.01%	99.94%
Cancer of bronchus; lung	7	0.01%	99.95%
Leukemias	7	0.01%	99.96%
Cancer of brain and nervous system	6	0.01%	99.97%
Cardiac arrest and ventricular fibrillation	6	0.01%	99.98%
Digestive congenital anomalies	6	0.01%	99.99%
Tuberculosis	5	0.00%	99.99%
Cancer of other GI organs; peritoneum	5	0.00%	99.99%
Endometriosis	5	0.00%	99.99%
Poisoning by psychotropic agents	5	0.00%	99.99%
Appendicitis and other appendiceal conditions	5	0.00%	99.99%
External cause codes: Transport; not MVT	5	0.00%	99.99%
Hodgkin`s disease	4	0.00%	99.99%
Acute and chronic tonsillitis	4	0.00%	99.99%
Cancer of testis	4	0.00%	99.99%
Peritonitis and intestinal abscess	3	0.00%	99.99%
Cancer of stomach	3	0.00%	99.99%
External cause codes: Fire/burn	3	0.00%	99.99%
External cause codes: Other specified; NEC	3	0.00%	99.99%
Secondary malignancies	3	0.00%	99.99%
Aortic and peripheral arterial embolism or thrombosis	3	0.00%	99.99%
Lung disease due to external agents	3	0.00%	99.99%
Cancer of rectum and anus	2	0.00%	99.99%
Other perinatal conditions	2	0.00%	99.99%
Cancer of esophagus	2	0.00%	99.99%

Cancer of head and neck	2	0.00%	99.99%
Gangrene	2	0.00%	99.99%
Malignant neoplasm without specification of site	2	0.00%	99.99%
External cause codes: Machinery	1	0.00%	99.99%
Sexually transmitted infections (not HIV or hepatitis)	1	0.00%	99.99%
External cause codes: Pedal cyclist; not MVT	1	0.00%	99.99%
Cancer; other respiratory and intrathoracic	1	0.00%	99.99%
External cause codes: Pedestrian; not MVT	1	0.00%	99.99%

Table I106. 6-Month Feature Space XGBoost Emergency Department Event Clinical Classifications Software (CCS) for Primary Diagnosis			
Clinical Classification Software (CCS) Description Principal Diagnosis	# ER Events	% ER Events	Cumulative Feature Importance
Nonspecific chest pain	2,074	6.69%	6.69%
Other lower respiratory disease	1,751	5.65%	12.34%
Other injuries and conditions due to external causes	1,548	4.99%	17.33%
Abdominal pain	1,466	4.73%	22.06%
Superficial injury; contusion	1,161	3.74%	25.80%
Other connective tissue disease	1,123	3.62%	29.42%
Spondylosis; intervertebral disc disorders; other back problems	1,120	3.61%	33.03%
Urinary tract infections	1,076	3.47%	36.50%
Other non-traumatic joint disorders	1,059	3.41%	39.91%
Headache; including migraine	795	2.56%	42.47%
Other gastrointestinal disorders	714	2.30%	44.77%
Residual codes; unclassified	698	2.25%	47.02%
Cardiac dysrhythmias	657	2.12%	49.14%
Malaise and fatigue	581	1.87%	51.01%
Conditions associated with dizziness or vertigo	565	1.82%	52.83%
Essential hypertension	535	1.73%	54.56%
Other nervous system disorders	525	1.69%	56.25%

Sprains and strains	454	1.46%	57.71%
Syncope	429	1.38%	59.09%
Fluid and electrolyte disorders	427	1.38%	60.47%
Skin and subcutaneous tissue infections	404	1.30%	61.77%
Open wounds of head; neck; and trunk	376	1.21%	62.98%
Other screening for suspected conditions (not mental disorders or infectious disease)	360	1.16%	64.14%
Nausea and vomiting	355	1.14%	65.28%
Complications of surgical procedures or medical care	344	1.11%	66.39%
Epilepsy; convulsions	338	1.09%	67.48%
Open wounds of extremities	329	1.06%	68.54%
Diabetes mellitus with complications	324	1.04%	69.58%
Genitourinary symptoms and ill-defined conditions	302	0.97%	70.55%
Chronic obstructive pulmonary disease and bronchiectasis	289	0.93%	71.48%
Complication of device; implant or graft	279	0.90%	72.38%
Other upper respiratory infections	263	0.85%	73.23%
Pleurisy; pneumothorax; pulmonary collapse	258	0.83%	74.06%
Other fractures	250	0.81%	74.87%
Hypertension with complications and secondary hypertension	248	0.80%	75.67%
Osteoarthritis	242	0.78%	76.45%
Congestive heart failure; nonhypertensive	241	0.78%	77.23%
Other skin disorders	212	0.68%	77.91%
Other circulatory disease	210	0.68%	78.59%
Fracture of upper limb	209	0.67%	79.26%
Diverticulosis and diverticulitis	192	0.62%	79.88%
Asthma	183	0.59%	80.47%
Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	180	0.58%	81.05%
Coronary atherosclerosis and other heart disease	177	0.57%	81.62%
Other upper respiratory disease	171	0.55%	82.17%
Acute bronchitis	164	0.53%	82.70%
Calculus of urinary tract	147	0.47%	83.17%
Gastrointestinal hemorrhage	142	0.46%	83.63%
Conduction disorders	136	0.44%	84.07%

Other and ill-defined heart disease	136	0.44%	84.51%
Other aftercare	130	0.42%	84.93%
Noninfectious gastroenteritis	130	0.42%	85.35%
Delirium dementia and amnestic and other cognitive disorders	129	0.42%	85.77%
Allergic reactions	124	0.40%	86.17%
Anxiety disorders	124	0.40%	86.57%
Transient cerebral ischemia	123	0.40%	86.97%
Acute cerebrovascular disease	116	0.37%	87.34%
Other diseases of kidney and ureters	115	0.37%	87.71%
Abdominal hernia	115	0.37%	88.08%
Fracture of lower limb	110	0.35%	88.43%
Fever of unknown origin	105	0.34%	88.77%
Intracranial injury	102	0.33%	89.10%
Disorders of teeth and jaw	94	0.30%	89.40%
Esophageal disorders	91	0.29%	89.69%
Gout and other crystal arthropathies	91	0.29%	89.98%
Other liver diseases	90	0.29%	90.27%
Biliary tract disease	90	0.29%	90.56%
Deficiency and other anemia	82	0.26%	90.82%
Rehabilitation care; fitting of prostheses; and adjustment of devices	75	0.24%	91.06%
Intestinal obstruction without hernia	72	0.23%	91.29%
Gastritis and duodenitis	71	0.23%	91.52%
Administrative/social admission	71	0.23%	91.75%
Other ear and sense organ disorders	70	0.23%	91.98%
Viral infection	66	0.21%	92.19%
Acute and unspecified renal failure	65	0.21%	92.40%
Phlebitis; thrombophlebitis and thromboembolism	63	0.20%	92.60%
Septicemia (except in labor)	62	0.20%	92.80%
Diabetes mellitus without complication	61	0.20%	93.00%
Acute myocardial infarction	59	0.19%	93.19%
Chronic ulcer of skin	55	0.18%	93.37%
Joint disorders and dislocations; trauma-related	54	0.17%	93.54%

Other eye disorders	53	0.17%	93.71%
Other bone disease and musculoskeletal deformities	53	0.17%	93.88%
Medical examination/evaluation	52	0.17%	94.05%
Other and ill-defined cerebrovascular disease	51	0.16%	94.21%
Heart valve disorders	50	0.16%	94.37%
Other nutritional; endocrine; and metabolic disorders	48	0.15%	94.52%
Skull and face fractures	47	0.15%	94.67%
Sickle cell anemia	47	0.15%	94.82%
Other endocrine disorders	46	0.15%	94.97%
Mycoses	45	0.15%	95.12%
Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)	45	0.15%	95.27%
Intestinal infection	44	0.14%	95.41%
Other hereditary and degenerative nervous system conditions	44	0.14%	95.55%
Other inflammatory condition of skin	42	0.14%	95.69%
Fracture of neck of femur (hip)	38	0.12%	95.81%
Peripheral and visceral atherosclerosis	37	0.12%	95.93%
Occlusion or stenosis of precerebral arteries	36	0.12%	96.05%
Other female genital disorders	36	0.12%	96.17%
Chronic kidney disease	34	0.11%	96.28%
Alcohol-related disorders	33	0.11%	96.39%
Mood disorders	33	0.11%	96.50%
Poisoning by non-medicinal substances	33	0.11%	96.61%
Respiratory failure; insufficiency; arrest (adult)	33	0.11%	96.72%
Blindness and vision defects	32	0.10%	96.82%
Otitis media and related conditions	31	0.10%	96.92%
Other acquired deformities	31	0.10%	97.02%
Other diseases of veins and lymphatics	30	0.10%	97.12%
Pancreatic disorders (not diabetes)	29	0.09%	97.21%
Anal and rectal conditions	28	0.09%	97.30%
Other disorders of stomach and duodenum	27	0.09%	97.39%
Hemorrhoids	27	0.09%	97.48%
Poisoning by other medications and drugs	27	0.09%	97.57%

Inflammatory diseases of female pelvic organs	25	0.08%	97.65%
Coma; stupor; and brain damage	25	0.08%	97.73%
Pulmonary heart disease	23	0.07%	97.80%
Hyperplasia of prostate	23	0.07%	97.87%
Adverse effects of medical drugs	23	0.07%	97.94%
Thyroid disorders	22	0.07%	98.01%
Crushing injury or internal injury	21	0.07%	98.08%
Ovarian cyst	20	0.06%	98.14%
Diseases of mouth; excluding dental	20	0.06%	98.20%
Influenza	19	0.06%	98.26%
Regional enteritis and ulcerative colitis	18	0.06%	98.32%
Other diseases of bladder and urethra	18	0.06%	98.38%
Miscellaneous mental health disorders	17	0.05%	98.43%
Diseases of white blood cells	17	0.05%	98.48%
Aspiration pneumonitis; food/vomitus	17	0.05%	98.53%
Burns	16	0.05%	98.58%
Inflammatory conditions of male genital organs	16	0.05%	98.63%
Late effects of cerebrovascular disease	16	0.05%	98.68%
Aortic; peripheral; and visceral artery aneurysms	16	0.05%	98.73%
Immunizations and screening for infectious disease	16	0.05%	98.78%
Benign neoplasm of uterus	16	0.05%	98.83%
Coagulation and hemorrhagic disorders	16	0.05%	98.88%
Peri-; endo-; and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease)	16	0.05%	98.93%
Other and unspecified benign neoplasm	16	0.05%	98.98%
Paralysis	15	0.05%	99.03%
Other male genital disorders	14	0.05%	99.08%
Nonmalignant breast conditions	14	0.05%	99.13%
Other infections; including parasitic	13	0.04%	99.17%
Rheumatoid arthritis and related disease	13	0.04%	99.21%
Parkinson`s disease	13	0.04%	99.25%
Bacterial infection; unspecified site	12	0.04%	99.29%
Pathological fracture	11	0.04%	99.33%

Infective arthritis and osteomyelitis (except that caused by tuberculosis or sexually transmitted disease)	11	0.04%	99.37%
Varicose veins of lower extremity	11	0.04%	99.41%
Disorders of lipid metabolism	10	0.03%	99.44%
Systemic lupus erythematosus and connective tissue disorders	10	0.03%	99.47%
Attention-deficit conduct and disruptive behavior disorders	10	0.03%	99.50%
Multiple sclerosis	8	0.03%	99.53%
Acute posthemorrhagic anemia	8	0.03%	99.56%
Menopausal disorders	8	0.03%	99.59%
Nutritional deficiencies	7	0.02%	99.61%
Other hematologic conditions	7	0.02%	99.63%
Lymphadenitis	7	0.02%	99.65%
Other congenital anomalies	6	0.02%	99.67%
Spinal cord injury	6	0.02%	99.69%
Disorders usually diagnosed in infancy childhood or adolescence	6	0.02%	99.71%
Menstrual disorders	5	0.02%	99.73%
Prolapse of female genital organs	5	0.02%	99.75%
Osteoporosis	5	0.02%	99.77%
Adjustment disorders	5	0.02%	99.79%
Personality disorders	4	0.01%	99.80%
Appendicitis and other appendiceal conditions	4	0.01%	99.81%
Developmental disorders	4	0.01%	99.82%
Immunity disorders	4	0.01%	99.83%
Glaucoma	4	0.01%	99.84%
Acquired foot deformities	4	0.01%	99.85%
Acute and chronic tonsillitis	3	0.01%	99.86%
Gastroduodenal ulcer (except hemorrhage)	3	0.01%	99.87%
Cardiac and circulatory congenital anomalies	3	0.01%	99.88%
Nephritis; nephrosis; renal sclerosis	3	0.01%	99.89%
Aortic and peripheral arterial embolism or thrombosis	3	0.01%	99.90%
Hepatitis	2	0.01%	99.91%
Poisoning by psychotropic agents	2	0.01%	99.92%
Gangrene	1	0.00%	99.92%

Substance-related disorders	1	0.00%	99.92%
Endometriosis	1	0.00%	99.92%
Sexually transmitted infections (not HIV or hepatitis)	1	0.00%	99.92%
Cataract	1	0.00%	99.92%
Cardiac arrest and ventricular fibrillation	1	0.00%	99.92%
Retinal detachments; defects; vascular occlusion; and retinopathy	1	0.00%	99.92%
Digestive congenital anomalies	1	0.00%	99.92%
Impulse control disorders NEC	1	0.00%	99.92%
Peritonitis and intestinal abscess	1	0.00%	99.92%

Data As a Decomposition of Population

Table I107. 12-Month Feature Space XGBoost Emergency Department Event Clinical Classifications Software (CCS)			
Clinical Classification Software (CCS) Description	# ER Events	% ER Events	Cumulative Feature Importance
Essential hypertension	486	7.78%	7.78%
Other aftercare	388	6.21%	13.99%
Disorders of lipid metabolism	192	3.07%	17.06%
Residual codes; unclassified	175	2.80%	19.86%
Other injuries and conditions due to external causes	167	2.67%	22.53%
Diabetes mellitus without complication	153	2.45%	24.98%
Nonspecific chest pain	151	2.42%	27.40%
Other connective tissue disease	148	2.37%	29.77%
Cardiac dysrhythmias	146	2.34%	32.11%
Spondylosis; intervertebral disc disorders; other back problems	137	2.19%	34.30%
Other lower respiratory disease	136	2.18%	36.48%
Superficial injury; contusion	133	2.13%	38.61%
Coronary atherosclerosis and other heart disease	121	1.94%	40.55%
Other circulatory disease	118	1.89%	42.44%
External cause codes: Fall	109	1.75%	44.19%
Thyroid disorders	108	1.73%	45.92%
Other non-traumatic joint disorders	108	1.73%	47.65%
Esophageal disorders	107	1.71%	49.36%

Allergic reactions	102	1.63%	50.99%
Urinary tract infections	93	1.49%	52.48%
Hypertension with complications and secondary hypertension	93	1.49%	53.97%
Malaise and fatigue	92	1.47%	55.44%
Abdominal pain	90	1.44%	56.88%
Other nervous system disorders	87	1.39%	58.27%
Headache; including migraine	87	1.39%	59.66%
Osteoarthritis	87	1.39%	61.05%
Delirium dementia and amnestic and other cognitive disorders	86	1.38%	62.43%
Congestive heart failure; nonhypertensive	83	1.33%	63.76%
Other gastrointestinal disorders	81	1.30%	65.06%
Fluid and electrolyte disorders	77	1.23%	66.29%
Conduction disorders	75	1.20%	67.49%
Conditions associated with dizziness or vertigo	73	1.17%	68.66%
Other screening for suspected conditions (not mental disorders or infectious disease)	63	1.01%	69.67%
Anxiety disorders	61	0.98%	70.65%
Chronic obstructive pulmonary disease and bronchiectasis	61	0.98%	71.63%
Mood disorders	51	0.82%	72.45%
Nausea and vomiting	51	0.82%	73.27%
Genitourinary symptoms and ill-defined conditions	48	0.77%	74.04%
Open wounds of head; neck; and trunk	48	0.77%	74.81%
Diabetes mellitus with complications	48	0.77%	75.58%
Chronic kidney disease	44	0.70%	76.28%
Open wounds of extremities	42	0.67%	76.95%
Syncope	41	0.66%	77.61%
Other nutritional; endocrine; and metabolic disorders	40	0.64%	78.25%
Sprains and strains	37	0.59%	78.84%
External cause codes: Place of occurrence	36	0.58%	79.42%
Other skin disorders	36	0.58%	80.00%
Heart valve disorders	32	0.51%	80.51%
Deficiency and other anemia	30	0.48%	80.99%
Diverticulosis and diverticulitis	30	0.48%	81.47%
Skin and subcutaneous tissue infections	29	0.46%	81.93%

Immunizations and screening for infectious disease	29	0.46%	82.39%
Osteoporosis	28	0.45%	82.84%
Fracture of upper limb	26	0.42%	83.26%
Abdominal hernia	25	0.40%	83.66%
Asthma	25	0.40%	84.06%
Other and ill-defined heart disease	24	0.38%	84.44%
Epilepsy; convulsions	24	0.38%	84.82%
Complications of surgical procedures or medical care	23	0.37%	85.19%
External cause codes: Natural/environment	23	0.37%	85.56%
Pleurisy; pneumothorax; pulmonary collapse	22	0.35%	85.91%
Gout and other crystal arthropathies	22	0.35%	86.26%
Phlebitis; thrombophlebitis and thromboembolism	21	0.34%	86.60%
Other fractures	21	0.34%	86.94%
Other diseases of kidney and ureters	21	0.34%	87.28%
Parkinson`s disease	20	0.32%	87.60%
Peripheral and visceral atherosclerosis	19	0.30%	87.90%
External cause codes: Unspecified	19	0.30%	88.20%
Paralysis	18	0.29%	88.49%
Other upper respiratory disease	18	0.29%	88.78%
Other ear and sense organ disorders	17	0.27%	89.05%
Biliary tract disease	17	0.27%	89.32%
Other hereditary and degenerative nervous system conditions	17	0.27%	89.59%
Fracture of lower limb	16	0.26%	89.85%
Intracranial injury	16	0.26%	90.11%
Other upper respiratory infections	16	0.26%	90.37%
Noninfectious gastroenteritis	15	0.24%	90.61%
Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	15	0.24%	90.85%
Fever of unknown origin	15	0.24%	91.09%
Developmental disorders	15	0.24%	91.33%
Other acquired deformities	15	0.24%	91.57%
Calculus of urinary tract	15	0.24%	91.81%
Bacterial infection; unspecified site	14	0.22%	92.03%
Gastrointestinal hemorrhage	13	0.21%	92.24%

Other liver diseases	13	0.21%	92.45%
Joint disorders and dislocations; trauma-related	13	0.21%	92.66%
Glaucoma	13	0.21%	92.87%
Cancer of breast	13	0.21%	93.08%
Diseases of white blood cells	12	0.19%	93.27%
Acute cerebrovascular disease	12	0.19%	93.46%
External cause codes: Struck by; against	12	0.19%	93.65%
Administrative/social admission	12	0.19%	93.84%
Hyperplasia of prostate	12	0.19%	94.03%
Pulmonary heart disease	11	0.18%	94.21%
Rheumatoid arthritis and related disease	11	0.18%	94.39%
Other bone disease and musculoskeletal deformities	10	0.16%	94.55%
Acute bronchitis	10	0.16%	94.71%
Other and ill-defined cerebrovascular disease	10	0.16%	94.87%
Other eye disorders	10	0.16%	95.03%
Respiratory failure; insufficiency; arrest (adult)	9	0.14%	95.17%
Alcohol-related disorders	9	0.14%	95.31%
Skull and face fractures	9	0.14%	95.45%
Coagulation and hemorrhagic disorders	8	0.13%	95.58%
Cancer of colon	8	0.13%	95.71%
Adverse effects of medical drugs	8	0.13%	95.84%
Acute and unspecified renal failure	8	0.13%	95.97%
Complication of device; implant or graft	8	0.13%	96.10%
Coma; stupor; and brain damage	7	0.11%	96.21%
Nutritional deficiencies	7	0.11%	96.32%
Occlusion or stenosis of precerebral arteries	7	0.11%	96.43%
Other non-epithelial cancer of skin	7	0.11%	96.54%
Other disorders of stomach and duodenum	7	0.11%	96.65%
Gastritis and duodenitis	7	0.11%	96.76%
Other inflammatory condition of skin	7	0.11%	96.87%
Poisoning by non medicinal substances	6	0.10%	96.97%
Mycoses	6	0.10%	97.07%
Retinal detachments; defects; vascular occlusion; and retinopathy	6	0.10%	97.17%

Other congenital anomalies	6	0.10%	97.27%
Other diseases of bladder and urethra	6	0.10%	97.37%
Medical examination/evaluation	6	0.10%	97.47%
Miscellaneous mental health disorders	6	0.10%	97.57%
Late effects of cerebrovascular disease	6	0.10%	97.67%
Rehabilitation care; fitting of prostheses; and adjustment of devices	6	0.10%	97.77%
Intestinal obstruction without hernia	6	0.10%	97.87%
Hemorrhoids	5	0.08%	97.95%
Other diseases of veins and lymphatics	5	0.08%	98.03%
Transient cerebral ischemia	5	0.08%	98.11%
Viral infection	5	0.08%	98.19%
Blindness and vision defects	5	0.08%	98.27%
Chronic ulcer of skin	5	0.08%	98.35%
Disorders of teeth and jaw	5	0.08%	98.43%
Fracture of neck of femur (hip)	5	0.08%	98.51%
Other male genital disorders	4	0.06%	98.57%
Peri-; endo-; and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease)	4	0.06%	98.63%
Gastroduodenal ulcer (except hemorrhage)	4	0.06%	98.69%
Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)	4	0.06%	98.75%
Acute myocardial infarction	3	0.05%	98.80%
Septicemia (except in labor)	3	0.05%	98.85%
Intestinal infection	3	0.05%	98.90%
Diseases of mouth; excluding dental	3	0.05%	98.95%
Aortic; peripheral; and visceral artery aneurysms	3	0.05%	99.00%
Other hematologic conditions	3	0.05%	99.05%
Poisoning by other medications and drugs	3	0.05%	99.10%
Influenza	3	0.05%	99.15%
Other and unspecified benign neoplasm	2	0.03%	99.18%
External cause codes: Cut/pierce	2	0.03%	99.21%
External cause codes: Motor vehicle traffic (MVT)	2	0.03%	99.24%
Hepatitis	2	0.03%	99.27%
Immunity disorders	2	0.03%	99.30%
Cataract	2	0.03%	99.33%

Cancer of prostate	2	0.03%	99.36%
Other endocrine disorders	2	0.03%	99.39%
Other female genital disorders	2	0.03%	99.42%
Other infections; including parasitic	2	0.03%	99.45%
Anal and rectal conditions	2	0.03%	99.48%
Pancreatic disorders (not diabetes)	2	0.03%	99.51%
Prolapse of female genital organs	2	0.03%	99.54%
Varicose veins of lower extremity	2	0.03%	99.57%
Cancer of bronchus; lung	1	0.02%	99.59%
Cancer of thyroid	1	0.02%	99.61%
Cancer of uterus	1	0.02%	99.63%
Poisoning by psychotropic agents	1	0.02%	99.65%
External cause codes: Other specified; NEC	1	0.02%	99.67%
Cancer; other and unspecified primary	1	0.02%	99.69%
Nonmalignant breast conditions	1	0.02%	99.71%
Cardiac and circulatory congenital anomalies	1	0.02%	99.73%
Multiple sclerosis	1	0.02%	99.75%
Cardiac arrest and ventricular fibrillation	1	0.02%	99.77%
Menopausal disorders	1	0.02%	99.79%
Melanomas of skin	1	0.02%	99.81%
Shock	1	0.02%	99.83%
Sickle cell anemia	1	0.02%	99.85%
Lymphadenitis	1	0.02%	99.87%
Inflammatory conditions of male genital organs	1	0.02%	99.89%
Adjustment disorders	1	0.02%	99.91%
Acute posthemorrhagic anemia	1	0.02%	99.93%
Infective arthritis and osteomyelitis (except that caused by tuberculosis or sexually transmitted disease)	1	0.02%	99.95%
HIV infection	1	0.02%	99.97%
Systemic lupus erythematosus and connective tissue disorders	1	0.02%	99.99%
Contraceptive and procreative management	1	0.02%	100.00%
External cause codes: Transport; not MVT	1	0.02%	100.00%
External cause codes: Pedestrian; not MVT	1	0.02%	100.00%
Attention-deficit conduct and disruptive behavior disorders	1	0.02%	100.00%

Burns	1	0.02%	100.00%
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Table I108. 12-Month Feature Space XGBoost Emergency Department Event Clinical Classifications Software (CCS) for Primary Diagnosis

Clinical Classification Software (CCS) Description Principal Diagnosis	# ER Events	% ER Events	Cumulative Feature Importance
Nonspecific chest pain	115	6.44%	6.44%
Other injuries and conditions due to external causes	113	6.33%	12.77%
Superficial injury; contusion	104	5.82%	18.59%
Other lower respiratory disease	82	4.59%	23.18%
Spondylosis; intervertebral disc disorders; other back problems	72	4.03%	27.21%
Other connective tissue disease	64	3.58%	30.79%
Other non-traumatic joint disorders	61	3.42%	34.21%
Abdominal pain	60	3.36%	37.57%
Urinary tract infections	57	3.19%	40.76%
Headache; including migraine	44	2.46%	43.22%
Conditions associated with dizziness or vertigo	41	2.30%	45.52%
Malaise and fatigue	38	2.13%	47.65%
Open wounds of head; neck; and trunk	37	2.07%	49.72%
Residual codes; unclassified	35	1.96%	51.68%
Other gastrointestinal disorders	34	1.90%	53.58%
Syncope	34	1.90%	55.48%
Cardiac dysrhythmias	34	1.90%	57.38%
Open wounds of extremities	33	1.85%	59.23%
Sprains and strains	29	1.62%	60.85%
Essential hypertension	27	1.51%	62.36%
Fluid and electrolyte disorders	26	1.46%	63.82%
Fracture of upper limb	24	1.34%	65.16%
Skin and subcutaneous tissue infections	23	1.29%	66.45%
Nausea and vomiting	18	1.01%	67.46%
Genitourinary symptoms and ill-defined conditions	18	1.01%	68.47%
Other screening for suspected conditions (not mental disorders or infectious disease)	18	1.01%	69.48%
Complications of surgical procedures or medical care	18	1.01%	70.49%

Other fractures	17	0.95%	71.44%
Osteoarthritis	15	0.84%	72.28%
Other nervous system disorders	15	0.84%	73.12%
Fracture of lower limb	15	0.84%	73.96%
Other aftercare	14	0.78%	74.74%
Joint disorders and dislocations; trauma-related	13	0.73%	75.47%
Other circulatory disease	13	0.73%	76.20%
Chronic obstructive pulmonary disease and bronchiectasis	13	0.73%	76.93%
Other skin disorders	13	0.73%	77.66%
Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	12	0.67%	78.33%
Diabetes mellitus with complications	12	0.67%	79.00%
Calculus of urinary tract	12	0.67%	79.67%
Pleurisy; pneumothorax; pulmonary collapse	12	0.67%	80.34%
Intracranial injury	11	0.62%	80.96%
Congestive heart failure; nonhypertensive	10	0.56%	81.52%
Other diseases of kidney and ureters	10	0.56%	82.08%
Noninfectious gastroenteritis	10	0.56%	82.64%
Delirium dementia and amnestic and other cognitive disorders	9	0.50%	83.14%
Acute bronchitis	9	0.50%	83.64%
Anxiety disorders	9	0.50%	84.14%
Conduction disorders	9	0.50%	84.64%
Gastrointestinal hemorrhage	9	0.50%	85.14%
Hypertension with complications and secondary hypertension	9	0.50%	85.64%
Other and ill-defined heart disease	9	0.50%	86.14%
Other upper respiratory infections	9	0.50%	86.64%
Complication of device; implant or graft	8	0.45%	87.09%
Biliary tract disease	8	0.45%	87.54%
Diverticulosis and diverticulitis	8	0.45%	87.99%
Coronary atherosclerosis and other heart disease	8	0.45%	88.44%
Acute cerebrovascular disease	7	0.39%	88.83%
Other upper respiratory disease	7	0.39%	89.22%
Asthma	6	0.34%	89.56%
Esophageal disorders	6	0.34%	89.90%

Intestinal obstruction without hernia	6	0.34%	90.24%
Abdominal hernia	6	0.34%	90.58%
Medical examination/evaluation	5	0.28%	90.86%
Peripheral and visceral atherosclerosis	5	0.28%	91.14%
Skull and face fractures	5	0.28%	91.42%
Poisoning by non-medicinal substances	5	0.28%	91.70%
Transient cerebral ischemia	5	0.28%	91.98%
Gout and other crystal arthropathies	5	0.28%	92.26%
Deficiency and other anemia	5	0.28%	92.54%
Rehabilitation care; fitting of prostheses; and adjustment of devices	4	0.22%	92.76%
Other ear and sense organ disorders	4	0.22%	92.98%
Epilepsy; convulsions	4	0.22%	93.20%
Hemorrhoids	4	0.22%	93.42%
Viral infection	4	0.22%	93.64%
Allergic reactions	4	0.22%	93.86%
Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)	4	0.22%	94.08%
Disorders of teeth and jaw	4	0.22%	94.30%
Other acquired deformities	4	0.22%	94.52%
Fracture of neck of femur (hip)	3	0.17%	94.69%
Alcohol-related disorders	3	0.17%	94.86%
Adverse effects of medical drugs	3	0.17%	95.03%
Septicemia (except in labor)	3	0.17%	95.20%
Administrative/social admission	3	0.17%	95.37%
Occlusion or stenosis of precerebral arteries	3	0.17%	95.54%
Heart valve disorders	3	0.17%	95.71%
Diabetes mellitus without complication	3	0.17%	95.88%
Intestinal infection	3	0.17%	96.05%
Coma; stupor; and brain damage	3	0.17%	96.22%
Other eye disorders	3	0.17%	96.39%
Other inflammatory condition of skin	3	0.17%	96.56%
Other liver diseases	3	0.17%	96.73%
Acute and unspecified renal failure	3	0.17%	96.90%
Chronic ulcer of skin	2	0.11%	97.01%

Varicose veins of lower extremity	2	0.11%	97.12%
Other and ill-defined cerebrovascular disease	2	0.11%	97.23%
Poisoning by other medications and drugs	2	0.11%	97.34%
Miscellaneous mental health disorders	2	0.11%	97.45%
Phlebitis; thrombophlebitis and thromboembolism	2	0.11%	97.56%
Pancreatic disorders (not diabetes)	2	0.11%	97.67%
Mycoses	2	0.11%	97.78%
Paralysis	2	0.11%	97.89%
Gastritis and duodenitis	2	0.11%	98.00%
Other nutritional; endocrine; and metabolic disorders	2	0.11%	98.11%
Acute myocardial infarction	2	0.11%	98.22%
Other disorders of stomach and duodenum	2	0.11%	98.33%
Nutritional deficiencies	2	0.11%	98.44%
Other diseases of veins and lymphatics	2	0.11%	98.55%
Influenza	2	0.11%	98.66%
Cardiac and circulatory congenital anomalies	1	0.06%	98.72%
Inflammatory conditions of male genital organs	1	0.06%	98.78%
Fever of unknown origin	1	0.06%	98.84%
Mood disorders	1	0.06%	98.90%
Diseases of white blood cells	1	0.06%	98.96%
Diseases of mouth; excluding dental	1	0.06%	99.02%
Other bone disease and musculoskeletal deformities	1	0.06%	99.08%
Other diseases of bladder and urethra	1	0.06%	99.14%
Other endocrine disorders	1	0.06%	99.20%
Other female genital disorders	1	0.06%	99.26%
Coagulation and hemorrhagic disorders	1	0.06%	99.32%
Other hereditary and degenerative nervous system conditions	1	0.06%	99.38%
Other infections; including parasitic	1	0.06%	99.44%
Chronic kidney disease	1	0.06%	99.50%
Cardiac arrest and ventricular fibrillation	1	0.06%	99.56%
Other male genital disorders	1	0.06%	99.62%
Burns	1	0.06%	99.68%
Parkinson`s disease	1	0.06%	99.74%

Prolapse of female genital organs	1	0.06%	99.80%
Pulmonary heart disease	1	0.06%	99.86%
Adjustment disorders	1	0.06%	99.92%
Acute posthemorrhagic anemia	1	0.06%	99.98%
Glaucoma	1	0.06%	100.00%

o2v BiLSTM Predictions

Data As a Decomposition of Time

Table I109. 6-Month Feature Space o2v BiLSTM Emergency Department Event Clinical Classifications Software (CCS)			
Clinical Classification Software (CCS) Description	# ER Events	% ER Events	Cumulative Feature Importance
Other aftercare	5,354	6.45%	6.45%
Essential hypertension	5,270	6.35%	12.80%
Residual codes; unclassified	2,618	3.15%	15.95%
Diabetes mellitus without complication	2,589	3.12%	19.07%
Disorders of lipid metabolism	2,309	2.78%	21.85%
Other lower respiratory disease	2,110	2.54%	24.39%
Allergic reactions	1,922	2.32%	26.71%
Other connective tissue disease	1,908	2.30%	29.01%
Cardiac dysrhythmias	1,853	2.23%	31.24%
Nonspecific chest pain	1,810	2.18%	33.42%
Coronary atherosclerosis and other heart disease	1,754	2.11%	35.53%
Abdominal pain	1,644	1.98%	37.51%
Esophageal disorders	1,626	1.96%	39.47%
Hypertension with complications and secondary hypertension	1,576	1.90%	41.37%
Spondylosis; intervertebral disc disorders; other back problems	1,555	1.87%	43.24%
Other circulatory disease	1,538	1.85%	45.09%
Other gastrointestinal disorders	1,482	1.79%	46.88%
Other nervous system disorders	1,482	1.79%	48.67%

Other injuries and conditions due to external causes	1,467	1.77%	50.44%
Congestive heart failure; nonhypertensive	1,377	1.66%	52.10%
Urinary tract infections	1,281	1.54%	53.64%
Thyroid disorders	1,273	1.53%	55.17%
Other non-traumatic joint disorders	1,207	1.45%	56.62%
Diabetes mellitus with complications	1,172	1.41%	58.03%
Headache; including migraine	1,069	1.29%	59.32%
Superficial injury; contusion	1,051	1.27%	60.59%
Anxiety disorders	967	1.17%	61.76%
Nausea and vomiting	961	1.16%	62.92%
Asthma	956	1.15%	64.07%
Osteoarthritis	943	1.14%	65.21%
Chronic obstructive pulmonary disease and bronchiectasis	898	1.08%	66.29%
Other nutritional; endocrine; and metabolic disorders	893	1.08%	67.37%
Conduction disorders	884	1.07%	68.44%
Chronic kidney disease	877	1.06%	69.50%
Fluid and electrolyte disorders	860	1.04%	70.54%
Malaise and fatigue	853	1.03%	71.57%
Delirium dementia and amnestic and other cognitive disorders	837	1.01%	72.58%
Other screening for suspected conditions (not mental disorders or infectious disease)	816	0.98%	73.56%
Mood disorders	810	0.98%	74.54%
Genitourinary symptoms and ill-defined conditions	792	0.95%	75.49%
External cause codes: Fall	759	0.91%	76.40%
Epilepsy; convulsions	666	0.80%	77.20%
Conditions associated with dizziness or vertigo	640	0.77%	77.97%
Deficiency and other anemia	540	0.65%	78.62%
Phlebitis; thrombophlebitis and thromboembolism	437	0.53%	79.15%
Syncope	404	0.49%	79.64%
Complications of surgical procedures or medical care	386	0.47%	80.11%
Sprains and strains	379	0.46%	80.57%
Skin and subcutaneous tissue infections	364	0.44%	81.01%
Other skin disorders	358	0.43%	81.44%

Other upper respiratory infections	341	0.41%	81.85%
Pulmonary heart disease	341	0.41%	82.26%
Developmental disorders	325	0.39%	82.65%
Heart valve disorders	325	0.39%	83.04%
Other and ill-defined heart disease	324	0.39%	83.43%
Paralysis	314	0.38%	83.81%
Parkinson`s disease	309	0.37%	84.18%
Pleurisy; pneumothorax; pulmonary collapse	306	0.37%	84.55%
Open wounds of head; neck; and trunk	301	0.36%	84.91%
Abdominal hernia	286	0.34%	85.25%
Complication of device; implant or graft	282	0.34%	85.59%
Calculus of urinary tract	280	0.34%	85.93%
External cause codes: Place of occurrence	271	0.33%	86.26%
Diverticulosis and diverticulitis	258	0.31%	86.57%
Other liver diseases	254	0.31%	86.88%
Open wounds of extremities	249	0.30%	87.18%
Other upper respiratory disease	244	0.29%	87.47%
Other hereditary and degenerative nervous system conditions	244	0.29%	87.76%
Other diseases of kidney and ureters	243	0.29%	88.05%
Osteoporosis	243	0.29%	88.34%
Other bone disease and musculoskeletal deformities	223	0.27%	88.61%
Administrative/social admission	223	0.27%	88.88%
Peripheral and visceral atherosclerosis	218	0.26%	89.14%
Gout and other crystal arthropathies	216	0.26%	89.40%
Bacterial infection; unspecified site	214	0.26%	89.66%
Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	195	0.23%	89.89%
Acute and unspecified renal failure	195	0.23%	90.12%
Fever of unknown origin	192	0.23%	90.35%
Rheumatoid arthritis and related disease	190	0.23%	90.58%
External cause codes: Natural/environment	176	0.21%	90.79%
External cause codes: Unspecified	175	0.21%	91.00%
Other ear and sense organ disorders	175	0.21%	91.21%

Immunizations and screening for infectious disease	166	0.20%	91.41%
Respiratory failure; insufficiency; arrest (adult)	165	0.20%	91.61%
Other fractures	165	0.20%	91.81%
Acute bronchitis	151	0.18%	91.99%
Late effects of cerebrovascular disease	151	0.18%	92.17%
Blindness and vision defects	145	0.17%	92.34%
Hyperplasia of prostate	135	0.16%	92.50%
Disorders of teeth and jaw	133	0.16%	92.66%
Noninfectious gastroenteritis	129	0.16%	92.82%
Other acquired deformities	128	0.15%	92.97%
Cancer of breast	127	0.15%	93.12%
Fracture of upper limb	126	0.15%	93.27%
Systemic lupus erythematosus and connective tissue disorders	124	0.15%	93.42%
Biliary tract disease	124	0.15%	93.57%
Other eye disorders	123	0.15%	93.72%
Gastrointestinal hemorrhage	119	0.14%	93.86%
Peri-; endo-; and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease)	119	0.14%	94.00%
Intracranial injury	118	0.14%	94.14%
Chronic ulcer of skin	112	0.13%	94.27%
Adverse effects of medical drugs	109	0.13%	94.40%
Other and ill-defined cerebrovascular disease	108	0.13%	94.53%
Nutritional deficiencies	108	0.13%	94.66%
Other inflammatory condition of skin	108	0.13%	94.79%
Glaucoma	106	0.13%	94.92%
Coagulation and hemorrhagic disorders	106	0.13%	95.05%
Multiple sclerosis	104	0.13%	95.18%
Gastritis and duodenitis	102	0.12%	95.30%
Viral infection	102	0.12%	95.42%
Acute cerebrovascular disease	101	0.12%	95.54%
Diseases of white blood cells	100	0.12%	95.66%
Other disorders of stomach and duodenum	99	0.12%	95.78%
Other congenital anomalies	97	0.12%	95.90%

Other endocrine disorders	97	0.12%	96.02%
Rehabilitation care; fitting of prostheses; and adjustment of devices	91	0.11%	96.13%
Other diseases of veins and lymphatics	91	0.11%	96.24%
Mycoses	87	0.10%	96.34%
Transient cerebral ischemia	87	0.10%	96.44%
Intestinal obstruction without hernia	86	0.10%	96.54%
Other diseases of bladder and urethra	83	0.10%	96.64%
External cause codes: Struck by; against	82	0.10%	96.74%
Fracture of lower limb	80	0.10%	96.84%
Sickle cell anemia	73	0.09%	96.93%
Other non-epithelial cancer of skin	71	0.09%	97.02%
Disorders usually diagnosed in infancy childhood or adolescence	70	0.08%	97.10%
Regional enteritis and ulcerative colitis	70	0.08%	97.18%
Aortic; peripheral; and visceral artery aneurysms	69	0.08%	97.26%
Other female genital disorders	66	0.08%	97.34%
Pancreatic disorders (not diabetes)	64	0.08%	97.42%
HIV infection	64	0.08%	97.50%
Septicemia (except in labor)	60	0.07%	97.57%
Occlusion or stenosis of precerebral arteries	58	0.07%	97.64%
Attention-deficit conduct and disruptive behavior disorders	57	0.07%	97.71%
Cancer of colon	56	0.07%	97.78%
Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)	55	0.07%	97.85%
Coma; stupor; and brain damage	54	0.07%	97.92%
Other and unspecified benign neoplasm	49	0.06%	97.98%
Miscellaneous mental health disorders	49	0.06%	98.04%
Retinal detachments; defects; vascular occlusion; and retinopathy	47	0.06%	98.10%
Other infections; including parasitic	46	0.06%	98.16%
Gastroduodenal ulcer (except hemorrhage)	44	0.05%	98.21%
Medical examination/evaluation	44	0.05%	98.26%
Skull and face fractures	44	0.05%	98.31%
Joint disorders and dislocations; trauma-related	44	0.05%	98.36%

Immunity disorders	44	0.05%	98.41%
Alcohol-related disorders	42	0.05%	98.46%
Other hematologic conditions	41	0.05%	98.51%
Acute myocardial infarction	41	0.05%	98.56%
Anal and rectal conditions	39	0.05%	98.61%
Contraceptive and procreative management	37	0.04%	98.65%
Otitis media and related conditions	37	0.04%	98.69%
Hemorrhoids	36	0.04%	98.73%
Other male genital disorders	31	0.04%	98.77%
Ovarian cyst	31	0.04%	98.81%
Hepatitis	30	0.04%	98.85%
Intestinal infection	30	0.04%	98.89%
Diseases of mouth; excluding dental	29	0.03%	98.92%
Lymphadenitis	29	0.03%	98.95%
Inflammatory diseases of female pelvic organs	28	0.03%	98.98%
Cataract	28	0.03%	99.01%
Nervous system congenital anomalies	27	0.03%	99.04%
Poisoning by non-medicinal substances	27	0.03%	99.07%
Infective arthritis and osteomyelitis (except that caused by tuberculosis or sexually transmitted disease)	26	0.03%	99.10%
Fracture of neck of femur (hip)	26	0.03%	99.13%
Cardiac and circulatory congenital anomalies	24	0.03%	99.16%
Cancer of kidney and renal pelvis	24	0.03%	99.19%
External cause codes: Cut/pierce	22	0.03%	99.22%
Cancer; other and unspecified primary	22	0.03%	99.25%
External cause codes: Motor vehicle traffic (MVT)	22	0.03%	99.28%
Cancer of uterus	21	0.03%	99.31%
Aspiration pneumonitis; food/vomitus	20	0.02%	99.33%
Acquired foot deformities	19	0.02%	99.35%
Poisoning by other medications and drugs	18	0.02%	99.37%
Inflammatory conditions of male genital organs	18	0.02%	99.39%
Varicose veins of lower extremity	17	0.02%	99.41%
Benign neoplasm of uterus	17	0.02%	99.43%

Cancer of ovary	17	0.02%	99.45%
Cancer of cervix	17	0.02%	99.47%
Nonmalignant breast conditions	16	0.02%	99.49%
Impulse control disorders NEC	16	0.02%	99.51%
Adjustment disorders	16	0.02%	99.53%
Adverse effects of medical care	16	0.02%	99.55%
Menopausal disorders	16	0.02%	99.57%
Pathological fracture	16	0.02%	99.59%
Burns	16	0.02%	99.61%
Crushing injury or internal injury	15	0.02%	99.63%
Acute posthemorrhagic anemia	14	0.02%	99.65%
Influenza	14	0.02%	99.67%
Cancer of prostate	14	0.02%	99.69%
Cancer of thyroid	13	0.02%	99.71%
Menstrual disorders	11	0.01%	99.72%
Other CNS infection and poliomyelitis	10	0.01%	99.73%
Personality disorders	10	0.01%	99.74%
Non-Hodgkin`s lymphoma	10	0.01%	99.75%
Substance-related disorders	10	0.01%	99.76%
Melanomas of skin	9	0.01%	99.77%
Nephritis; nephrosis; renal sclerosis	9	0.01%	99.78%
Spinal cord injury	9	0.01%	99.79%
Prolapse of female genital organs	9	0.01%	99.80%
External cause codes: Overexertion	8	0.01%	99.81%
Genitourinary congenital anomalies	8	0.01%	99.82%
Neoplasms of unspecified nature or uncertain behavior	8	0.01%	99.83%
Endometriosis	7	0.01%	99.84%
Leukemias	7	0.01%	99.85%
Cancer of bladder	6	0.01%	99.86%
Lung disease due to external agents	5	0.01%	99.87%
External cause codes: Other specified; NEC	5	0.01%	99.88%
External cause codes: Other specified and classifiable	5	0.01%	99.89%

External cause codes: Fire/burn	5	0.01%	99.90%
Peritonitis and intestinal abscess	5	0.01%	99.91%
Sexually transmitted infections (not HIV or hepatitis)	4	0.00%	99.91%
Shock	4	0.00%	99.91%
Cancer of bronchus; lung	4	0.00%	99.91%
Acute and chronic tonsillitis	4	0.00%	99.91%
Cystic fibrosis	4	0.00%	99.91%
Cancer of stomach	4	0.00%	99.91%
Cancer of other GI organs; peritoneum	4	0.00%	99.91%
Cancer of esophagus	3	0.00%	99.91%
Cancer of brain and nervous system	3	0.00%	99.91%
Cardiac arrest and ventricular fibrillation	3	0.00%	99.91%
Other perinatal conditions	3	0.00%	99.91%
Digestive congenital anomalies	3	0.00%	99.91%
External cause codes: Transport; not MVT	3	0.00%	99.91%
Tuberculosis	3	0.00%	99.91%
Hodgkin's disease	3	0.00%	99.91%
Malignant neoplasm without specification of site	3	0.00%	99.91%
Cancer of head and neck	2	0.00%	99.91%
Appendicitis and other appendiceal conditions	2	0.00%	99.91%
Secondary malignancies	2	0.00%	99.91%
Cancer of testis	2	0.00%	99.91%
Aortic and peripheral arterial embolism or thrombosis	2	0.00%	99.91%
Gangrene	1	0.00%	99.91%
Cancer of rectum and anus	1	0.00%	99.91%
External cause codes: Pedestrian; not MVT	1	0.00%	99.91%
Poisoning by psychotropic agents	1	0.00%	99.91%

Table II10. 6-Month Feature Space o2v BiLSTM Emergency Department Event Clinical Classifications Software (CCS) for Primary Diagnosis

Clinical Classification Software (CCS) Description Principal Diagnosis	# ER Events	% ER Events	Cumulative Feature Importance
Nonspecific chest pain	1,451	6.66%	6.66%
Other lower respiratory disease	1,266	5.81%	12.47%
Abdominal pain	1,125	5.16%	17.63%
Other injuries and conditions due to external causes	1,009	4.63%	22.26%
Other connective tissue disease	804	3.69%	25.95%
Urinary tract infections	792	3.64%	29.59%
Spondylosis; intervertebral disc disorders; other back problems	773	3.55%	33.14%
Other non-traumatic joint disorders	756	3.47%	36.61%
Superficial injury; contusion	744	3.41%	40.02%
Other gastrointestinal disorders	595	2.73%	42.75%
Headache; including migraine	586	2.69%	45.44%
Residual codes; unclassified	467	2.14%	47.58%
Cardiac dysrhythmias	431	1.98%	49.56%
Malaise and fatigue	402	1.85%	51.41%
Other nervous system disorders	381	1.75%	53.16%
Conditions associated with dizziness or vertigo	345	1.58%	54.74%
Complications of surgical procedures or medical care	315	1.45%	56.19%
Sprains and strains	311	1.43%	57.62%
Essential hypertension	301	1.38%	59.00%
Diabetes mellitus with complications	300	1.38%	60.38%
Fluid and electrolyte disorders	282	1.29%	61.67%
Syncope	281	1.29%	62.96%
Skin and subcutaneous tissue infections	280	1.29%	64.25%
Epilepsy; convulsions	263	1.21%	65.46%
Other screening for suspected conditions (not mental disorders or infectious disease)	250	1.15%	66.61%
Nausea and vomiting	250	1.15%	67.76%
Open wounds of head; neck; and trunk	239	1.10%	68.86%
Complication of device; implant or graft	237	1.09%	69.95%
Other upper respiratory infections	233	1.07%	71.02%

Genitourinary symptoms and ill-defined conditions	226	1.04%	72.06%
Chronic obstructive pulmonary disease and bronchiectasis	196	0.90%	72.96%
Open wounds of extremities	186	0.85%	73.81%
Asthma	162	0.74%	74.55%
Osteoarthritis	161	0.74%	75.29%
Pleurisy; pneumothorax; pulmonary collapse	160	0.73%	76.02%
Other skin disorders	156	0.72%	76.74%
Hypertension with complications and secondary hypertension	155	0.71%	77.45%
Congestive heart failure; nonhypertensive	153	0.70%	78.15%
Other circulatory disease	146	0.67%	78.82%
Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	132	0.61%	79.43%
Acute bronchitis	122	0.56%	79.99%
Other fractures	117	0.54%	80.53%
Coronary atherosclerosis and other heart disease	116	0.53%	81.06%
Fracture of upper limb	114	0.52%	81.58%
Diverticulosis and diverticulitis	113	0.52%	82.10%
Other upper respiratory disease	105	0.48%	82.58%
Anxiety disorders	100	0.46%	83.04%
Noninfectious gastroenteritis	99	0.45%	83.49%
Calculus of urinary tract	96	0.44%	83.93%
Conduction disorders	95	0.44%	84.37%
Disorders of teeth and jaw	94	0.43%	84.80%
Gastrointestinal hemorrhage	93	0.43%	85.23%
Allergic reactions	93	0.43%	85.66%
Other and ill-defined heart disease	87	0.40%	86.06%
Gout and other crystal arthropathies	83	0.38%	86.44%
Delirium dementia and amnestic and other cognitive disorders	82	0.38%	86.82%
Fever of unknown origin	81	0.37%	87.19%
Abdominal hernia	78	0.36%	87.55%
Deficiency and other anemia	78	0.36%	87.91%
Other aftercare	75	0.34%	88.25%
Rehabilitation care; fitting of prostheses; and adjustment of devices	73	0.34%	88.59%

Fracture of lower limb	70	0.32%	88.91%
Transient cerebral ischemia	68	0.31%	89.22%
Acute cerebrovascular disease	68	0.31%	89.53%
Esophageal disorders	65	0.30%	89.83%
Other diseases of kidney and ureters	64	0.29%	90.12%
Other liver diseases	64	0.29%	90.41%
Biliary tract disease	63	0.29%	90.70%
Intestinal obstruction without hernia	60	0.28%	90.98%
Intracranial injury	60	0.28%	91.26%
Gastritis and duodenitis	60	0.28%	91.54%
Diabetes mellitus without complication	56	0.26%	91.80%
Administrative/social admission	56	0.26%	92.06%
Acute and unspecified renal failure	55	0.25%	92.31%
Viral infection	54	0.25%	92.56%
Sickle cell anemia	47	0.22%	92.78%
Other ear and sense organ disorders	44	0.20%	92.98%
Mycoses	43	0.20%	93.18%
Septicemia (except in labor)	41	0.19%	93.37%
Other eye disorders	40	0.18%	93.55%
Phlebitis; thrombophlebitis and thromboembolism	38	0.17%	93.72%
Other endocrine disorders	37	0.17%	93.89%
Other bone disease and musculoskeletal deformities	37	0.17%	94.06%
Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)	37	0.17%	94.23%
Chronic ulcer of skin	36	0.17%	94.40%
Skull and face fractures	34	0.16%	94.56%
Other hereditary and degenerative nervous system conditions	34	0.16%	94.72%
Acute myocardial infarction	34	0.16%	94.88%
Heart valve disorders	33	0.15%	95.03%
Other and ill-defined cerebrovascular disease	30	0.14%	95.17%
Medical examination/evaluation	30	0.14%	95.31%
Chronic kidney disease	30	0.14%	95.45%
Joint disorders and dislocations; trauma-related	30	0.14%	95.59%

Other nutritional; endocrine; and metabolic disorders	29	0.13%	95.72%
Other female genital disorders	29	0.13%	95.85%
Intestinal infection	27	0.12%	95.97%
Other inflammatory condition of skin	25	0.11%	96.08%
Mood disorders	24	0.11%	96.19%
Other diseases of veins and lymphatics	23	0.11%	96.30%
Respiratory failure; insufficiency; arrest (adult)	22	0.10%	96.40%
Otitis media and related conditions	22	0.10%	96.50%
Inflammatory diseases of female pelvic organs	21	0.10%	96.60%
Blindness and vision defects	21	0.10%	96.70%
Anal and rectal conditions	21	0.10%	96.80%
Other disorders of stomach and duodenum	20	0.09%	96.89%
Occlusion or stenosis of precerebral arteries	20	0.09%	96.98%
Pancreatic disorders (not diabetes)	20	0.09%	97.07%
Ovarian cyst	20	0.09%	97.16%
Peripheral and visceral atherosclerosis	19	0.09%	97.25%
Coma; stupor; and brain damage	19	0.09%	97.34%
Poisoning by non-medicinal substances	19	0.09%	97.43%
Fracture of neck of femur (hip)	18	0.08%	97.51%
Other acquired deformities	18	0.08%	97.59%
Other male genital disorders	18	0.08%	97.67%
Miscellaneous mental health disorders	17	0.08%	97.75%
Pulmonary heart disease	17	0.08%	97.83%
Alcohol-related disorders	16	0.07%	97.90%
Inflammatory conditions of male genital organs	15	0.07%	97.97%
Poisoning by other medications and drugs	14	0.06%	98.03%
Hemorrhoids	14	0.06%	98.09%
Burns	14	0.06%	98.15%
Other diseases of bladder and urethra	14	0.06%	98.21%
Thyroid disorders	14	0.06%	98.27%
Regional enteritis and ulcerative colitis	14	0.06%	98.33%
Diseases of mouth; excluding dental	14	0.06%	98.39%

Paralysis	14	0.06%	98.45%
Aspiration pneumonitis; food/vomitus	13	0.06%	98.51%
Late effects of cerebrovascular disease	13	0.06%	98.57%
Adverse effects of medical drugs	13	0.06%	98.63%
Coagulation and hemorrhagic disorders	11	0.05%	98.68%
Aortic; peripheral; and visceral artery aneurysms	11	0.05%	98.73%
Immunizations and screening for infectious disease	11	0.05%	98.78%
Other infections; including parasitic	11	0.05%	98.83%
Varicose veins of lower extremity	11	0.05%	98.88%
Benign neoplasm of uterus	10	0.05%	98.93%
Bacterial infection; unspecified site	10	0.05%	98.98%
Lymphadenitis	10	0.05%	99.03%
Parkinson`s disease	10	0.05%	99.08%
Crushing injury or internal injury	10	0.05%	99.13%
Peri-; endo-; and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease)	9	0.04%	99.17%
Attention-deficit conduct and disruptive behavior disorders	9	0.04%	99.21%
Hyperplasia of prostate	9	0.04%	99.25%
Influenza	9	0.04%	99.29%
Nonmalignant breast conditions	9	0.04%	99.33%
Menstrual disorders	9	0.04%	99.37%
Other and unspecified benign neoplasm	9	0.04%	99.41%
Diseases of white blood cells	8	0.04%	99.45%
Systemic lupus erythematosus and connective tissue disorders	8	0.04%	99.49%
Multiple sclerosis	8	0.04%	99.53%
Rheumatoid arthritis and related disease	7	0.03%	99.56%
Infective arthritis and osteomyelitis (except that caused by tuberculosis or sexually transmitted disease)	7	0.03%	99.59%
Pathological fracture	6	0.03%	99.62%
Acute posthemorrhagic anemia	6	0.03%	99.65%
Developmental disorders	6	0.03%	99.68%
Nutritional deficiencies	6	0.03%	99.71%
Acquired foot deformities	5	0.02%	99.73%
Prolapse of female genital organs	5	0.02%	99.75%

Other congenital anomalies	5	0.02%	99.77%
Adjustment disorders	5	0.02%	99.79%
Spinal cord injury	4	0.02%	99.81%
Immunity disorders	4	0.02%	99.83%
Glaucoma	4	0.02%	99.85%
Disorders of lipid metabolism	4	0.02%	99.87%
Disorders usually diagnosed in infancy childhood or adolescence	4	0.02%	99.89%
Other hematologic conditions	3	0.01%	99.90%
Peritonitis and intestinal abscess	3	0.01%	99.91%
Sexually transmitted infections (not HIV or hepatitis)	2	0.01%	99.92%
Osteoporosis	2	0.01%	99.93%
Personality disorders	2	0.01%	99.94%
Aortic and peripheral arterial embolism or thrombosis	2	0.01%	99.95%
Menopausal disorders	2	0.01%	99.96%
Gastroduodenal ulcer (except hemorrhage)	2	0.01%	99.97%
Acute and chronic tonsillitis	2	0.01%	99.98%
Cardiac and circulatory congenital anomalies	2	0.01%	99.99%
Digestive congenital anomalies	1	0.00%	99.99%
Substance-related disorders	1	0.00%	99.99%
Cystic fibrosis	1	0.00%	99.99%
Poisoning by psychotropic agents	1	0.00%	99.99%
Shock	1	0.00%	99.99%
Endometriosis	1	0.00%	99.99%
Other perinatal conditions	1	0.00%	99.99%
Appendicitis and other appendiceal conditions	1	0.00%	99.99%
Impulse control disorders NEC	1	0.00%	99.99%
Retinal detachments; defects; vascular occlusion; and retinopathy	1	0.00%	99.99%

Data As a Decomposition of Population

Table I111. 12-Month Feature Space o2v BiLSTM Emergency Department Event Clinical Classifications Software (CCS)

Clinical Classification Software (CCS) Description	# ER Events	% ER Events	Cumulative Feature Importance
Essential hypertension	2,141	6.42%	6.42%
Other aftercare	2,051	6.15%	12.57%
Residual codes; unclassified	1,037	3.11%	15.68%
Disorders of lipid metabolism	998	2.99%	18.67%
Diabetes mellitus without complication	878	2.63%	21.30%
Other lower respiratory disease	832	2.49%	23.79%
Other connective tissue disease	807	2.42%	26.21%
Nonspecific chest pain	759	2.28%	28.49%
Allergic reactions	752	2.25%	30.74%
Coronary atherosclerosis and other heart disease	738	2.21%	32.95%
Cardiac dysrhythmias	738	2.21%	35.16%
Abdominal pain	685	2.05%	37.21%
Esophageal disorders	656	1.97%	39.18%
Spondylosis; intervertebral disc disorders; other back problems	637	1.91%	41.09%
Other circulatory disease	628	1.88%	42.97%
Other gastrointestinal disorders	622	1.86%	44.83%
Hypertension with complications and secondary hypertension	620	1.86%	46.69%
Other injuries and conditions due to external causes	611	1.83%	48.52%
Other nervous system disorders	604	1.81%	50.33%
Thyroid disorders	521	1.56%	51.89%
Congestive heart failure; nonhypertensive	520	1.56%	53.45%
Other non-traumatic joint disorders	483	1.45%	54.90%
Superficial injury; contusion	467	1.40%	56.30%
Headache; including migraine	465	1.39%	57.69%
Urinary tract infections	454	1.36%	59.05%
Diabetes mellitus with complications	434	1.30%	60.35%
Nausea and vomiting	415	1.24%	61.59%
Osteoarthritis	391	1.17%	62.76%
Anxiety disorders	388	1.16%	63.92%

Conduction disorders	376	1.13%	65.05%
Mood disorders	367	1.10%	66.15%
Delirium dementia and amnestic and other cognitive disorders	363	1.09%	67.24%
Asthma	361	1.08%	68.32%
Chronic kidney disease	359	1.08%	69.40%
Malaise and fatigue	354	1.06%	70.46%
Other screening for suspected conditions (not mental disorders or infectious disease)	349	1.05%	71.51%
Chronic obstructive pulmonary disease and bronchiectasis	348	1.04%	72.55%
Other nutritional; endocrine; and metabolic disorders	327	0.98%	73.53%
Fluid and electrolyte disorders	326	0.98%	74.51%
External cause codes: Fall	310	0.93%	75.44%
Conditions associated with dizziness or vertigo	283	0.85%	76.29%
Genitourinary symptoms and ill-defined conditions	278	0.83%	77.12%
Epilepsy; convulsions	229	0.69%	77.81%
Deficiency and other anemia	212	0.64%	78.45%
Phlebitis; thrombophlebitis and thromboembolism	180	0.54%	78.99%
Sprains and strains	158	0.47%	79.46%
Heart valve disorders	156	0.47%	79.93%
Syncope	153	0.46%	80.39%
Other skin disorders	150	0.45%	80.84%
Complications of surgical procedures or medical care	148	0.44%	81.28%
Pulmonary heart disease	146	0.44%	81.72%
Paralysis	136	0.41%	82.13%
Skin and subcutaneous tissue infections	135	0.40%	82.53%
Pleurisy; pneumothorax; pulmonary collapse	135	0.40%	82.93%
Developmental disorders	135	0.40%	83.33%
Other upper respiratory infections	133	0.40%	83.73%
Abdominal hernia	128	0.38%	84.11%
Other liver diseases	126	0.38%	84.49%
Open wounds of head; neck; and trunk	123	0.37%	84.86%
Open wounds of extremities	116	0.35%	85.21%
Diverticulosis and diverticulitis	113	0.34%	85.55%

External cause codes: Place of occurrence	112	0.34%	85.89%
Other upper respiratory disease	112	0.34%	86.23%
Other and ill-defined heart disease	109	0.33%	86.56%
Other diseases of kidney and ureters	109	0.33%	86.89%
Osteoporosis	109	0.33%	87.22%
Calculus of urinary tract	106	0.32%	87.54%
Bacterial infection; unspecified site	101	0.30%	87.84%
Other bone disease and musculoskeletal deformities	99	0.30%	88.14%
Gout and other crystal arthropathies	95	0.28%	88.42%
Complication of device; implant or graft	94	0.28%	88.70%
Rheumatoid arthritis and related disease	94	0.28%	88.98%
Other hereditary and degenerative nervous system conditions	92	0.28%	89.26%
Fever of unknown origin	85	0.25%	89.51%
External cause codes: Unspecified	85	0.25%	89.76%
Other fractures	83	0.25%	90.01%
External cause codes: Natural/environment	81	0.24%	90.25%
Peripheral and visceral atherosclerosis	77	0.23%	90.48%
Respiratory failure; insufficiency; arrest (adult)	76	0.23%	90.71%
Acute and unspecified renal failure	75	0.22%	90.93%
Parkinson`s disease	75	0.22%	91.15%
Administrative/social admission	75	0.22%	91.37%
Other ear and sense organ disorders	72	0.22%	91.59%
Acute bronchitis	69	0.21%	91.80%
Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	67	0.20%	92.00%
Other congenital anomalies	60	0.18%	92.18%
Cancer of breast	59	0.18%	92.36%
Systemic lupus erythematosus and connective tissue disorders	59	0.18%	92.54%
Immunizations and screening for infectious disease	58	0.17%	92.71%
Other acquired deformities	57	0.17%	92.88%
Noninfectious gastroenteritis	55	0.16%	93.04%
Other eye disorders	54	0.16%	93.20%
Fracture of upper limb	54	0.16%	93.36%

Blindness and vision defects	51	0.15%	93.51%
Late effects of cerebrovascular disease	51	0.15%	93.66%
Biliary tract disease	51	0.15%	93.81%
Coagulation and hemorrhagic disorders	50	0.15%	93.96%
Acute cerebrovascular disease	49	0.15%	94.11%
Intestinal obstruction without hernia	49	0.15%	94.26%
Disorders of teeth and jaw	48	0.14%	94.40%
Peri-; endo-; and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease)	46	0.14%	94.54%
Hyperplasia of prostate	46	0.14%	94.68%
Glaucoma	43	0.13%	94.81%
Other diseases of veins and lymphatics	43	0.13%	94.94%
Other inflammatory condition of skin	42	0.13%	95.07%
Gastrointestinal hemorrhage	41	0.12%	95.19%
Chronic ulcer of skin	41	0.12%	95.31%
Transient cerebral ischemia	40	0.12%	95.43%
Other disorders of stomach and duodenum	40	0.12%	95.55%
Intracranial injury	40	0.12%	95.67%
Fracture of lower limb	39	0.12%	95.79%
Nutritional deficiencies	39	0.12%	95.91%
Other and ill-defined cerebrovascular disease	38	0.11%	96.02%
Other endocrine disorders	35	0.10%	96.12%
Adverse effects of medical drugs	34	0.10%	96.22%
Gastritis and duodenitis	34	0.10%	96.32%
Other non-epithelial cancer of skin	33	0.10%	96.42%
Viral infection	31	0.09%	96.51%
Disorders usually diagnosed in infancy childhood or adolescence	31	0.09%	96.60%
Regional enteritis and ulcerative colitis	31	0.09%	96.69%
Rehabilitation care; fitting of prostheses; and adjustment of devices	31	0.09%	96.78%
Diseases of white blood cells	30	0.09%	96.87%
Occlusion or stenosis of precerebral arteries	28	0.08%	96.95%
Other diseases of bladder and urethra	28	0.08%	97.03%
Coma; stupor; and brain damage	27	0.08%	97.11%

Mycoses	27	0.08%	97.19%
Joint disorders and dislocations; trauma-related	25	0.07%	97.26%
Skull and face fractures	24	0.07%	97.33%
Medical examination/evaluation	24	0.07%	97.40%
External cause codes: Struck by; against	24	0.07%	97.47%
Otitis media and related conditions	23	0.07%	97.54%
Aortic; peripheral; and visceral artery aneurysms	23	0.07%	97.61%
HIV infection	22	0.07%	97.68%
Acute myocardial infarction	22	0.07%	97.75%
Multiple sclerosis	22	0.07%	97.82%
Septicemia (except in labor)	22	0.07%	97.89%
Alcohol-related disorders	21	0.06%	97.95%
Other hematologic conditions	20	0.06%	98.01%
Attention-deficit conduct and disruptive behavior disorders	20	0.06%	98.07%
Pancreatic disorders (not diabetes)	19	0.06%	98.13%
Retinal detachments; defects; vascular occlusion; and retinopathy	19	0.06%	98.19%
Other female genital disorders	19	0.06%	98.25%
Ovarian cyst	18	0.05%	98.30%
Miscellaneous mental health disorders	18	0.05%	98.35%
Gastroduodenal ulcer (except hemorrhage)	17	0.05%	98.40%
Cancer of colon	17	0.05%	98.45%
Anal and rectal conditions	17	0.05%	98.50%
Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)	17	0.05%	98.55%
Other infections; including parasitic	16	0.05%	98.60%
Diseases of mouth; excluding dental	15	0.04%	98.64%
Other and unspecified benign neoplasm	15	0.04%	98.68%
Intestinal infection	14	0.04%	98.72%
External cause codes: Motor vehicle traffic (MVT)	14	0.04%	98.76%
Cataract	14	0.04%	98.80%
Other male genital disorders	13	0.04%	98.84%
Hemorrhoids	12	0.04%	98.88%
Benign neoplasm of uterus	12	0.04%	98.92%

External cause codes: Cut/pierce	12	0.04%	98.96%
Nervous system congenital anomalies	12	0.04%	99.00%
Varicose veins of lower extremity	11	0.03%	99.03%
Immunity disorders	11	0.03%	99.06%
Sickle cell anemia	11	0.03%	99.09%
Cardiac and circulatory congenital anomalies	10	0.03%	99.12%
Acquired foot deformities	10	0.03%	99.15%
Inflammatory diseases of female pelvic organs	10	0.03%	99.18%
Poisoning by non-medicinal substances	10	0.03%	99.21%
Cancer of ovary	10	0.03%	99.24%
Fracture of neck of femur (hip)	10	0.03%	99.27%
Crushing injury or internal injury	10	0.03%	99.30%
Cancer of uterus	10	0.03%	99.33%
Adjustment disorders	9	0.03%	99.36%
Contraceptive and procreative management	9	0.03%	99.39%
Nonmalignant breast conditions	9	0.03%	99.42%
Cancer of cervix	9	0.03%	99.45%
Infective arthritis and osteomyelitis (except that caused by tuberculosis or sexually transmitted disease)	8	0.02%	99.47%
Hepatitis	8	0.02%	99.49%
Adverse effects of medical care	7	0.02%	99.51%
Lymphadenitis	7	0.02%	99.53%
Pathological fracture	7	0.02%	99.55%
Neoplasms of unspecified nature or uncertain behavior	7	0.02%	99.57%
Influenza	6	0.02%	99.59%
Cancer; other and unspecified primary	6	0.02%	99.61%
Nephritis; nephrosis; renal sclerosis	6	0.02%	99.63%
Burns	6	0.02%	99.65%
Personality disorders	6	0.02%	99.67%
Aspiration pneumonitis; food/vomitus	5	0.01%	99.68%
Menopausal disorders	5	0.01%	99.69%
Acute posthemorrhagic anemia	5	0.01%	99.70%
Impulse control disorders NEC	5	0.01%	99.71%

Poisoning by other medications and drugs	5	0.01%	99.72%
Non-Hodgkin's lymphoma	5	0.01%	99.73%
External cause codes: Other specified and classifiable	4	0.01%	99.74%
Cancer of prostate	4	0.01%	99.75%
Genitourinary congenital anomalies	4	0.01%	99.76%
Inflammatory conditions of male genital organs	4	0.01%	99.77%
Leukemias	4	0.01%	99.78%
Spinal cord injury	3	0.01%	99.79%
Melanomas of skin	3	0.01%	99.80%
Cancer of other GI organs; peritoneum	3	0.01%	99.81%
Cancer of kidney and renal pelvis	3	0.01%	99.82%
Other CNS infection and poliomyelitis	2	0.01%	99.83%
Shock	2	0.01%	99.84%
Cancer of brain and nervous system	2	0.01%	99.85%
Cancer of bronchus; lung	2	0.01%	99.86%
Digestive congenital anomalies	2	0.01%	99.87%
Acute and chronic tonsillitis	2	0.01%	99.88%
Prolapse of female genital organs	2	0.01%	99.89%
Substance-related disorders	2	0.01%	99.90%
Menstrual disorders	2	0.01%	99.91%
Poisoning by psychotropic agents	1	0.00%	99.91%
External cause codes: Pedal cyclist; not MVT	1	0.00%	99.91%
External cause codes: Overexertion	1	0.00%	99.91%
External cause codes: Fire/burn	1	0.00%	99.91%
Endometriosis	1	0.00%	99.91%
Gangrene	1	0.00%	99.91%
Cystic fibrosis	1	0.00%	99.91%
Cardiac arrest and ventricular fibrillation	1	0.00%	99.91%
Cancer of thyroid	1	0.00%	99.91%
Cancer of testis	1	0.00%	99.91%
External cause codes: Pedestrian; not MVT	1	0.00%	99.91%
Cancer of bladder	1	0.00%	99.91%

External cause codes: Transport; not MVT	1	0.00%	99.91%
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Table I112. 12-Month Feature Space o2v BiLSTM Emergency Department Event Clinical Classifications Software (CCS) for Primary Diagnosis

Clinical Classification Software (CCS) Description Principal Diagnosis	# ER Events	% ER Events	Cumulative Feature Importance
Nonspecific chest pain	593	6.80%	6.80%
Abdominal pain	469	5.38%	12.18%
Other lower respiratory disease	456	5.23%	17.41%
Other injuries and conditions due to external causes	418	4.79%	22.20%
Other connective tissue disease	331	3.79%	25.99%
Spondylosis; intervertebral disc disorders; other back problems	328	3.76%	29.75%
Superficial injury; contusion	326	3.74%	33.49%
Other non-traumatic joint disorders	297	3.40%	36.89%
Urinary tract infections	277	3.18%	40.07%
Headache; including migraine	247	2.83%	42.90%
Other gastrointestinal disorders	239	2.74%	45.64%
Residual codes; unclassified	198	2.27%	47.91%
Cardiac dysrhythmias	182	2.09%	50.00%
Malaise and fatigue	172	1.97%	51.97%
Conditions associated with dizziness or vertigo	163	1.87%	53.84%
Other nervous system disorders	146	1.67%	55.51%
Sprains and strains	130	1.49%	57.00%
Essential hypertension	130	1.49%	58.49%
Syncope	114	1.31%	59.80%
Complications of surgical procedures or medical care	112	1.28%	61.08%
Nausea and vomiting	111	1.27%	62.35%
Fluid and electrolyte disorders	104	1.19%	63.54%
Open wounds of head; neck; and trunk	99	1.13%	64.67%
Epilepsy; convulsions	99	1.13%	65.80%

Skin and subcutaneous tissue infections	96	1.10%	66.90%
Open wounds of extremities	91	1.04%	67.94%
Diabetes mellitus with complications	90	1.03%	68.97%
Complication of device; implant or graft	84	0.96%	69.93%
Other upper respiratory infections	82	0.94%	70.87%
Chronic obstructive pulmonary disease and bronchiectasis	82	0.94%	71.81%
Other screening for suspected conditions (not mental disorders or infectious disease)	76	0.87%	72.68%
Other skin disorders	68	0.78%	73.46%
Hypertension with complications and secondary hypertension	68	0.78%	74.24%
Genitourinary symptoms and ill-defined conditions	67	0.77%	75.01%
Other circulatory disease	67	0.77%	75.78%
Pleurisy; pneumothorax; pulmonary collapse	63	0.72%	76.50%
Asthma	61	0.70%	77.20%
Osteoarthritis	61	0.70%	77.90%
Other fractures	60	0.69%	78.59%
Congestive heart failure; nonhypertensive	57	0.65%	79.24%
Other upper respiratory disease	56	0.64%	79.88%
Acute bronchitis	52	0.60%	80.48%
Fracture of upper limb	48	0.55%	81.03%
Coronary atherosclerosis and other heart disease	47	0.54%	81.57%
Diverticulosis and diverticulitis	47	0.54%	82.11%
Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	45	0.52%	82.63%
Conduction disorders	44	0.50%	83.13%
Abdominal hernia	43	0.49%	83.62%
Anxiety disorders	41	0.47%	84.09%
Allergic reactions	41	0.47%	84.56%
Noninfectious gastroenteritis	40	0.46%	85.02%
Intestinal obstruction without hernia	39	0.45%	85.47%
Calculus of urinary tract	39	0.45%	85.92%
Fever of unknown origin	37	0.42%	86.34%
Other diseases of kidney and ureters	36	0.41%	86.75%
Other and ill-defined heart disease	36	0.41%	87.16%

Other liver diseases	35	0.40%	87.56%
Esophageal disorders	33	0.38%	87.94%
Fracture of lower limb	33	0.38%	88.32%
Disorders of teeth and jaw	33	0.38%	88.70%
Acute cerebrovascular disease	32	0.37%	89.07%
Transient cerebral ischemia	32	0.37%	89.44%
Gastrointestinal hemorrhage	29	0.33%	89.77%
Other aftercare	28	0.32%	90.09%
Biliary tract disease	28	0.32%	90.41%
Delirium dementia and amnestic and other cognitive disorders	27	0.31%	90.72%
Intracranial injury	25	0.29%	91.01%
Deficiency and other anemia	22	0.25%	91.26%
Joint disorders and dislocations; trauma-related	21	0.24%	91.50%
Gastritis and duodenitis	21	0.24%	91.74%
Rehabilitation care; fitting of prostheses; and adjustment of devices	20	0.23%	91.97%
Skull and face fractures	20	0.23%	92.20%
Viral infection	18	0.21%	92.41%
Diabetes mellitus without complication	18	0.21%	92.62%
Other bone disease and musculoskeletal deformities	18	0.21%	92.83%
Medical examination/evaluation	18	0.21%	93.04%
Gout and other crystal arthropathies	18	0.21%	93.25%
Acute and unspecified renal failure	17	0.19%	93.44%
Other eye disorders	17	0.19%	93.63%
Other ear and sense organ disorders	17	0.19%	93.82%
Chronic ulcer of skin	16	0.18%	94.00%
Phlebitis; thrombophlebitis and thromboembolism	16	0.18%	94.18%
Administrative/social admission	15	0.17%	94.35%
Other diseases of veins and lymphatics	14	0.16%	94.51%
Other endocrine disorders	14	0.16%	94.67%
Ovarian cyst	14	0.16%	94.83%
Acute myocardial infarction	13	0.15%	94.98%
Otitis media and related conditions	13	0.15%	95.13%

Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)	13	0.15%	95.28%
Occlusion or stenosis of precerebral arteries	12	0.14%	95.42%
Septicemia (except in labor)	12	0.14%	95.56%
Other hereditary and degenerative nervous system conditions	12	0.14%	95.70%
Intestinal infection	12	0.14%	95.84%
Other and ill-defined cerebrovascular disease	12	0.14%	95.98%
Mycoses	11	0.13%	96.11%
Heart valve disorders	11	0.13%	96.24%
Other acquired deformities	11	0.13%	96.37%
Anal and rectal conditions	10	0.11%	96.48%
Other nutritional; endocrine; and metabolic disorders	10	0.11%	96.59%
Other female genital disorders	10	0.11%	96.70%
Crushing injury or internal injury	9	0.10%	96.80%
Poisoning by non-medicinal substances	9	0.10%	96.90%
Chronic kidney disease	9	0.10%	97.00%
Other disorders of stomach and duodenum	8	0.09%	97.09%
Inflammatory diseases of female pelvic organs	8	0.09%	97.18%
Blindness and vision defects	8	0.09%	97.27%
Fracture of neck of femur (hip)	8	0.09%	97.36%
Other inflammatory condition of skin	8	0.09%	97.45%
Diseases of mouth; excluding dental	8	0.09%	97.54%
Pulmonary heart disease	7	0.08%	97.62%
Other male genital disorders	7	0.08%	97.70%
Benign neoplasm of uterus	7	0.08%	97.78%
Paralysis	7	0.08%	97.86%
Peripheral and visceral atherosclerosis	7	0.08%	97.94%
Alcohol-related disorders	7	0.08%	98.02%
Respiratory failure; insufficiency; arrest (adult)	7	0.08%	98.10%
Varicose veins of lower extremity	7	0.08%	98.18%
Coma; stupor; and brain damage	6	0.07%	98.25%
Coagulation and hemorrhagic disorders	6	0.07%	98.32%
Aortic; peripheral; and visceral artery aneurysms	6	0.07%	98.39%

Miscellaneous mental health disorders	6	0.07%	98.46%
Burns	6	0.07%	98.53%
Diseases of white blood cells	6	0.07%	98.60%
Rheumatoid arthritis and related disease	6	0.07%	98.67%
Thyroid disorders	6	0.07%	98.74%
Attention-deficit conduct and disruptive behavior disorders	5	0.06%	98.80%
Poisoning by other medications and drugs	5	0.06%	98.86%
Nutritional deficiencies	5	0.06%	98.92%
Regional enteritis and ulcerative colitis	5	0.06%	98.98%
Mood disorders	5	0.06%	99.04%
Hemorrhoids	5	0.06%	99.10%
Late effects of cerebrovascular disease	4	0.05%	99.15%
Peri-, endo-, and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease)	4	0.05%	99.20%
Influenza	3	0.03%	99.23%
Disorders usually diagnosed in infancy childhood or adolescence	3	0.03%	99.26%
Gastroduodenal ulcer (except hemorrhage)	3	0.03%	99.29%
Infective arthritis and osteomyelitis (except that caused by tuberculosis or sexually transmitted disease)	3	0.03%	99.32%
Pancreatic disorders (not diabetes)	3	0.03%	99.35%
Pathological fracture	3	0.03%	99.38%
Aspiration pneumonitis; food/vomitus	3	0.03%	99.41%
Inflammatory conditions of male genital organs	3	0.03%	99.44%
Other infections; including parasitic	3	0.03%	99.47%
Adverse effects of medical drugs	3	0.03%	99.50%
Adjustment disorders	3	0.03%	99.53%
Other diseases of bladder and urethra	3	0.03%	99.56%
Other congenital anomalies	3	0.03%	99.59%
Bacterial infection; unspecified site	2	0.02%	99.61%
Retinal detachments; defects; vascular occlusion; and retinopathy	2	0.02%	99.63%
Systemic lupus erythematosus and connective tissue disorders	2	0.02%	99.65%
Sickle cell anemia	2	0.02%	99.67%
Nonmalignant breast conditions	2	0.02%	99.69%
Glaucoma	2	0.02%	99.71%

Immunizations and screening for infectious disease	2	0.02%	99.73%
Developmental disorders	2	0.02%	99.75%
Acute and chronic tonsillitis	2	0.02%	99.77%
Other hematologic conditions	2	0.02%	99.79%
Multiple sclerosis	2	0.02%	99.81%
Acquired foot deformities	1	0.01%	99.82%
Disorders of lipid metabolism	1	0.01%	99.83%
Menstrual disorders	1	0.01%	99.84%
Substance-related disorders	1	0.01%	99.85%
Lymphadenitis	1	0.01%	99.86%
Parkinson`s disease	1	0.01%	99.87%
Cystic fibrosis	1	0.01%	99.88%
Personality disorders	1	0.01%	99.89%
Spinal cord injury	1	0.01%	99.90%
Hyperplasia of prostate	1	0.01%	99.91%