PRELIMINARY RESULTS FOR BRAZIL COVID-19 DATASET

Salomon Wollenstein-Betech, Christos G. Cassandras, Ioannis Ch. Paschalidis, Amanda Batista, Julia Fleck

1 Basic Analytics

	0
N	92662
N_Hosp	84195
N_Death	31788
Female	39658
Male	52979
Race	26525
Schooling	7058
Acute Respiratory Distress Syndrome	22854
Contracted At Hospital	2374
Contact Birds Pigs	744
Fever	67553
Cough	70434
Throat	19587
Dyspnea	64220
Respiratory Discomfort	53370
SpO2 less 95\%	51025
Diarrhea	12502
Vomiting	7010
Other Symptoms	29366
Postpartum	403
Cardiovascular Disease	28978
Hematologic Disease	852
Down Syndrome	238
Liver Chronic Disease	773
Asthma	2544
Diabetes	21990
Neurological Disease	3457
Another Chronic Pneumopathy	3326
Immunosuppression	2745
Renal Chronic Disease	3717
Obesity	3313
Other Risks	22495
Antiviral Use	29747
Hospitalization	84195
ICU	27840
Ventilator	16963
Xray Torax Result	2409
Result Final	0
Evolution	35639
Hospital Region ID	0
Public Hospital	30867

Table 1: Number of observations with a specific observation

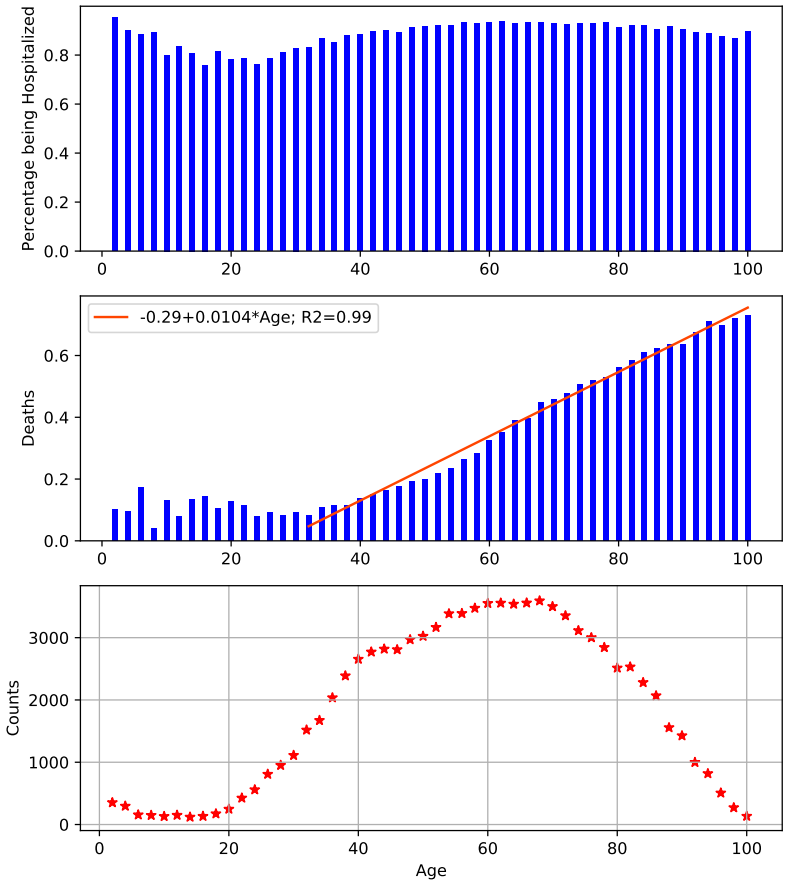


Figure 1: Distribution of hospitalization and deaths by age group

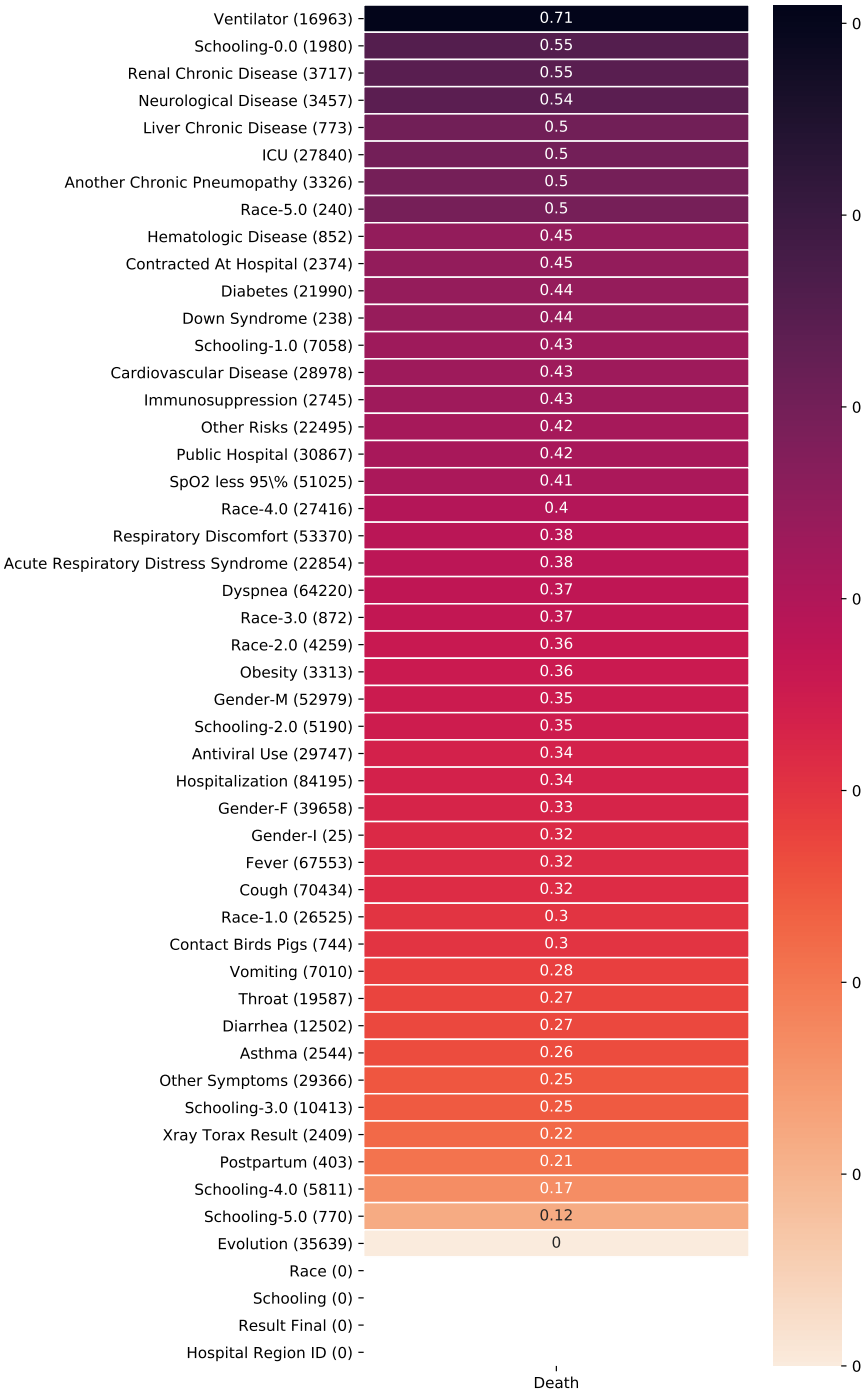


Figure 2: Share of hospitalized and deaths patients given characteristics

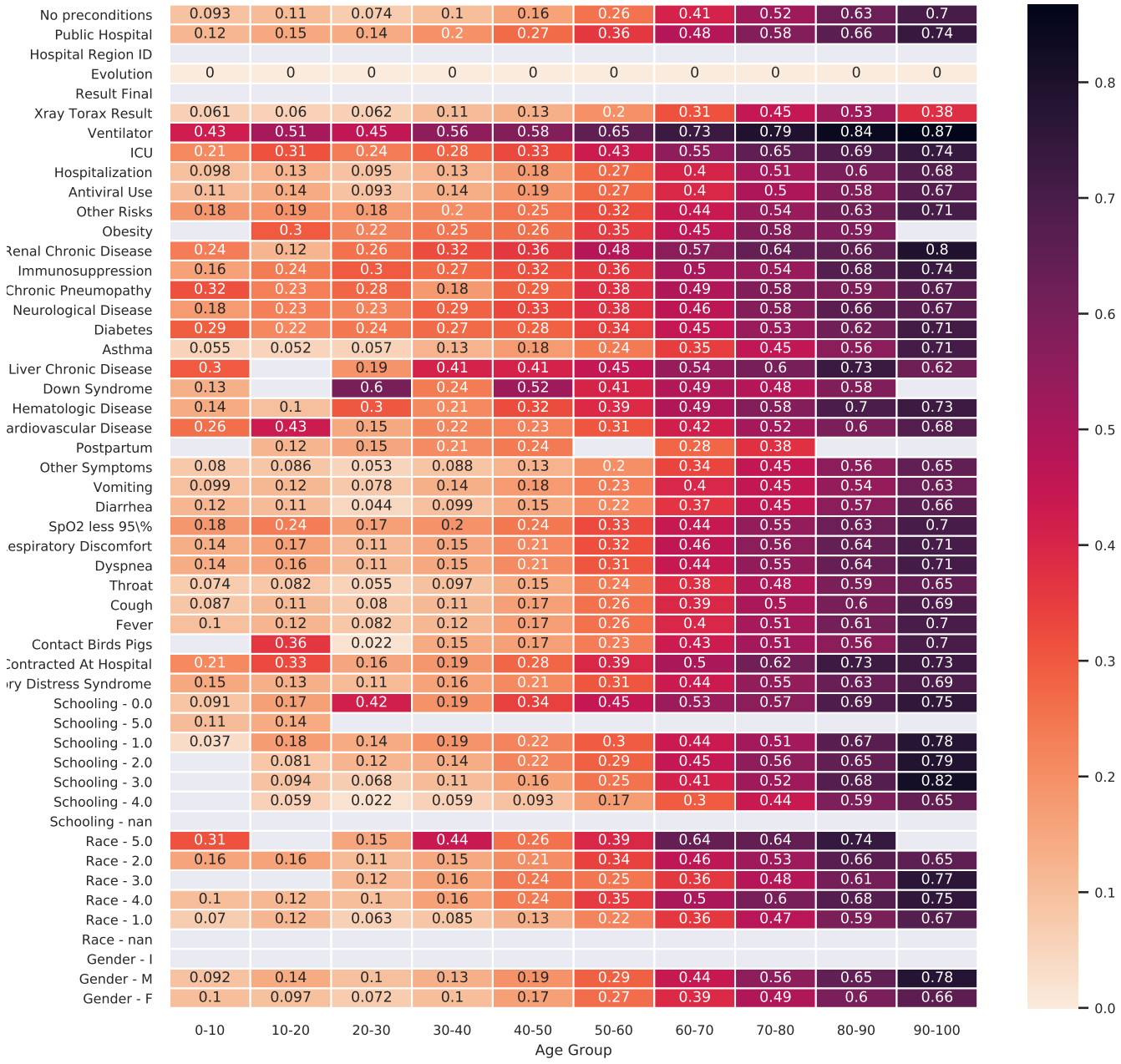
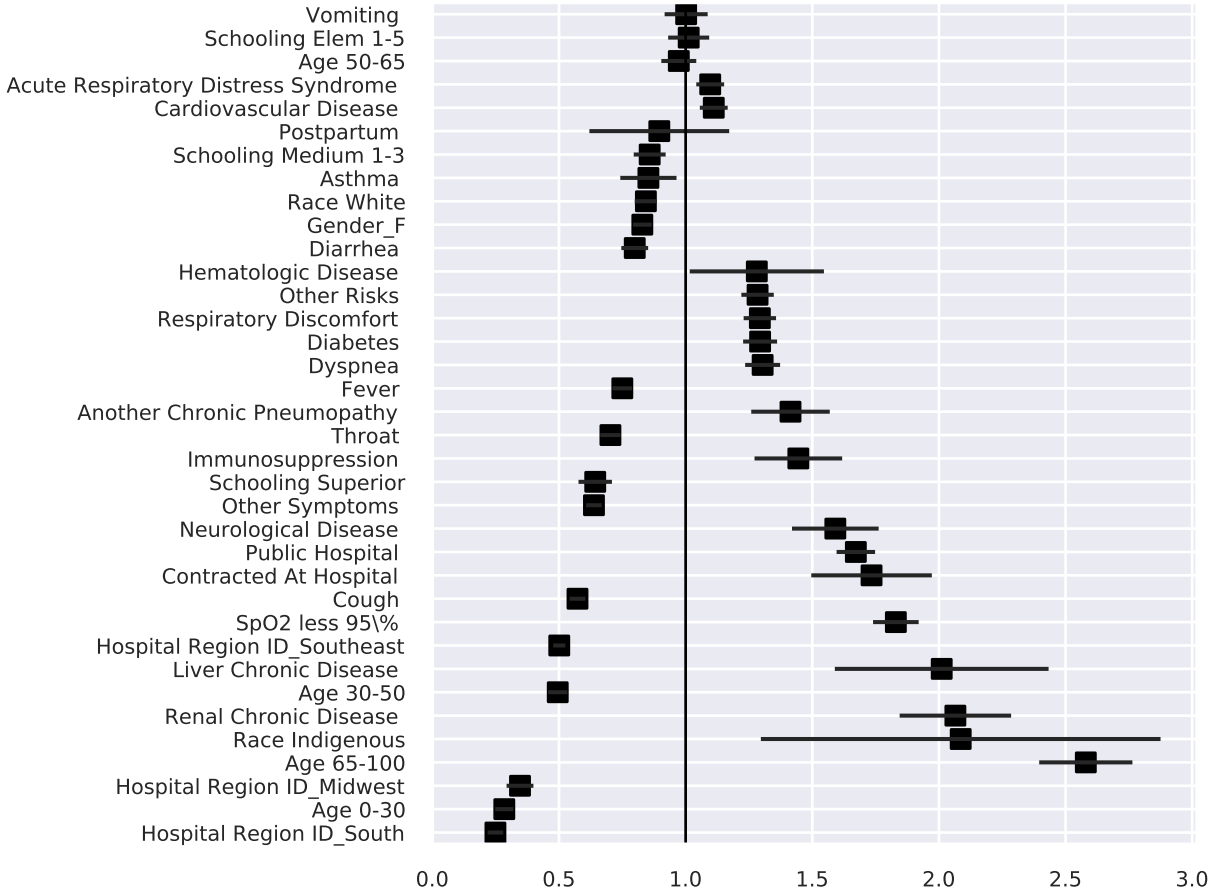


Figure 3: Share of hospitalized and deaths patients given characteristics and age group

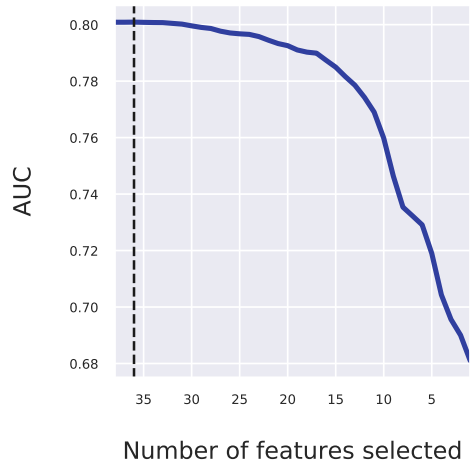
2 Results

2.1 Mortality (previous)

	Coef	2.5	97.5	Odds Ratio	2.5	97.5	Avg-0	Avg-1	KS-pv	pvalue	SVM-l1
	LR-l1	err									
Hospital Region ID_South	-1.390	-1.521	-1.260	0.249	0.218	0.284	0.473	0.220	0.0	0.000	0.592
	0.244	0.031									
Age 0-30	-1.260	-1.394	-1.125	0.284	0.248	0.325	0.480	0.150	0.0	0.000	0.584
	0.218	0.036									
Hospital Region ID_Midwest	-1.060	-1.228	-0.893	0.346	0.293	0.409	0.464	0.317	0.0	0.000	0.664
	0.341	0.053									
Age 65-100	0.948	0.874	1.021	2.580	2.396	2.777	0.307	0.677	0.0	0.000	1.369
	1.992	0.184									
Race Indigenous	0.735	0.260	1.210	2.086	1.297	3.355	0.461	0.709	0.0	0.002	1.285
	1.933	0.789									
Renal Chronic Disease	0.725	0.612	0.838	2.065	1.845	2.312	0.450	0.702	0.0	0.000	1.322
	2.046	0.220									
Age 30-50	-0.704	-0.783	-0.624	0.495	0.457	0.536	0.548	0.224	0.0	0.000	0.696
	0.384	0.038									
Liver Chronic Disease	0.699	0.463	0.934	2.011	1.589	2.545	0.459	0.656	0.0	0.000	1.301
	1.968	0.422									
Hospital Region ID_Southeast	-0.691	-0.741	-0.642	0.501	0.477	0.526	0.529	0.415	0.0	0.000	0.756
	0.487	0.024									
SpO2 less 95\%	0.604	0.554	0.654	1.830	1.740	1.924	0.342	0.544	0.0	0.000	1.256
	1.818	0.090									
Cough	-0.556	-0.613	-0.499	0.573	0.542	0.607	0.579	0.427	0.0	0.000	0.801
	0.558	0.031									
Contracted At Hospital	0.550	0.403	0.698	1.734	1.496	2.009	0.457	0.642	0.0	0.000	1.226
	1.708	0.238									
Public Hospital	0.514	0.468	0.560	1.672	1.596	1.751	0.405	0.555	0.0	0.000	1.211
	1.646	0.076									
Neurological Disease	0.465	0.350	0.579	1.591	1.420	1.784	0.452	0.677	0.0	0.000	1.193
	1.577	0.171									
Other Symptoms	-0.450	-0.500	-0.400	0.638	0.607	0.670	0.508	0.357	0.0	0.000	0.839
	0.628	0.031									
Schooling Superior	-0.441	-0.549	-0.332	0.643	0.577	0.717	0.474	0.254	0.0	0.000	0.853
	0.637	0.066									
Immunosuppression	0.368	0.240	0.496	1.445	1.272	1.642	0.458	0.564	0.0	0.000	1.149
	1.435	0.173									
Throat	-0.353	-0.410	-0.295	0.703	0.663	0.745	0.483	0.377	0.0	0.000	0.876
	0.704	0.040									
Another Chronic Pneumopathy	0.346	0.231	0.462	1.414	1.259	1.587	0.454	0.639	0.0	0.000	1.142
	1.409	0.155									
Fever	-0.288	-0.341	-0.234	0.750	0.711	0.791	0.557	0.429	0.0	0.000	0.885
	0.731	0.039									
Dyspnea	0.265	0.211	0.320	1.304	1.235	1.377	0.375	0.493	0.0	0.000	1.097
	1.272	0.069									
Diabetes	0.258	0.205	0.310	1.294	1.227	1.364	0.420	0.583	0.0	0.000	1.105
	1.287	0.067									
Respiratory Discomfort	0.257	0.206	0.307	1.293	1.229	1.360	0.394	0.505	0.0	0.000	1.101
	1.280	0.064									
Other Risks	0.250	0.199	0.301	1.284	1.220	1.351	0.434	0.538	0.0	0.000	1.095
	1.271	0.064									
Hematologic Disease	0.248	0.016	0.479	1.281	1.016	1.615	0.460	0.585	0.0	0.036	1.093
	1.262	0.265									
Diarrhea	-0.224	-0.294	-0.154	0.799	0.746	0.857	0.474	0.378	0.0	0.000	0.919
	0.798	0.053									
Gender_F	-0.188	-0.233	-0.143	0.829	0.792	0.867	0.470	0.450	0.0	0.000	0.927
	0.815	0.037									
Race White	-0.171	-0.224	-0.117	0.843	0.799	0.889	0.492	0.390	0.0	0.000	0.935
	0.839	0.044									
Asthma	-0.159	-0.299	-0.018	0.853	0.742	0.982	0.464	0.366	0.0	0.027	0.942
	0.858	0.111									
Schooling Medium 1-3	-0.153	-0.229	-0.077	0.858	0.795	0.926	0.476	0.340	0.0	0.000	0.941
	0.852	0.063									
Postpartum	-0.109	-0.479	0.260	0.896	0.620	1.297	0.462	0.271	0.0	0.561	0.950
	0.910	0.276									
Cardiovascular Disease	0.105	0.055	0.155	1.111	1.056	1.168	0.411	0.561	0.0	0.000	1.038
	1.104	0.055									
Acute Respiratory Distress Syndrome	0.092	0.041	0.143	1.097	1.042	1.154	0.444	0.510	0.0	0.000	1.030
	1.084	0.055									
Age 50-65	-0.028	-0.101	0.045	0.973	0.904	1.046	0.479	0.420	0.0	0.454	0.904
	0.764	0.069									
Schooling Elem 1-5	0.012	-0.071	0.095	1.012	0.931	1.099	0.453	0.558	0.0	0.784	1.002
	1.005	0.081									
Vomiting	0.002	-0.087	0.092	1.002	0.917	1.096	0.467	0.394	0.0	0.957	0.998
	1.000	0.085									

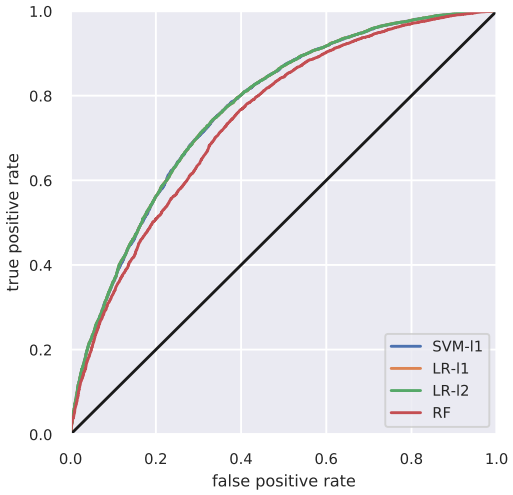

Vomiting
Schooling Elem 1-5
Age 50-65
Acute Respiratory Distress Syndrome
Cardiovascular Disease
Postpartum
Schooling Medium 1-3
Asthma
Race White
Gender_F
Diarrhea
Hematologic Disease
Other Risks
Respiratory Discomfort
Diabetes
Dyspnea
Fever
Another Chronic Pneumopathy
Throat
Immunosuppression
Schooling Superior
Other Symptoms
Neurological Disease
Public Hospital
Contracted At Hospital
Cough
SpO2 less 95\%
Hospital Region ID_Southeast
Liver Chronic Disease
Age 30-50
Renal Chronic Disease
Race Indigenous
Age 65-100
Hospital Region ID_Midwest
Age 0-30
Hospital Region ID_South
0.0
0.5
1.0
1.5
2.0
2.5
3.0

Recursive Feature Elimination:



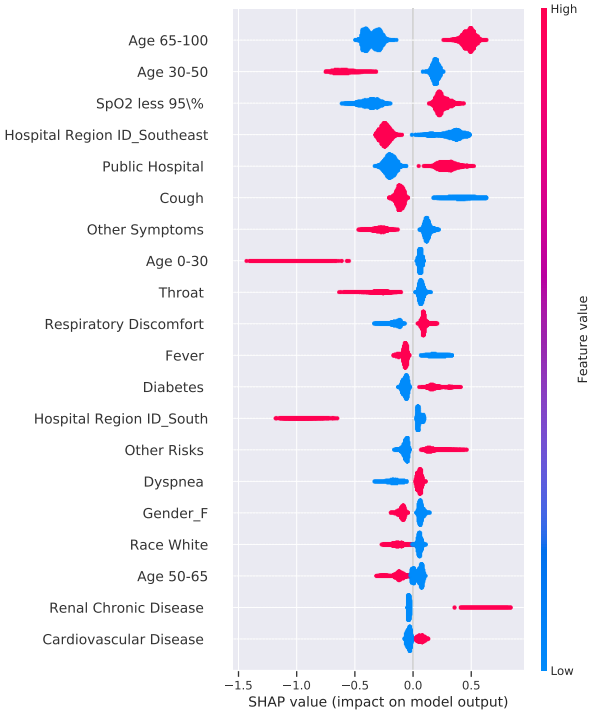
Performance:

	SVM-l1	LR-l1	LR-l2	RF	XGBoost
Accuracy	0.701	0.701	0.701	0.670	0.701
F1w	0.701	0.701	0.701	0.669	0.701
AUC	0.770	0.770	0.770	0.744	0.773



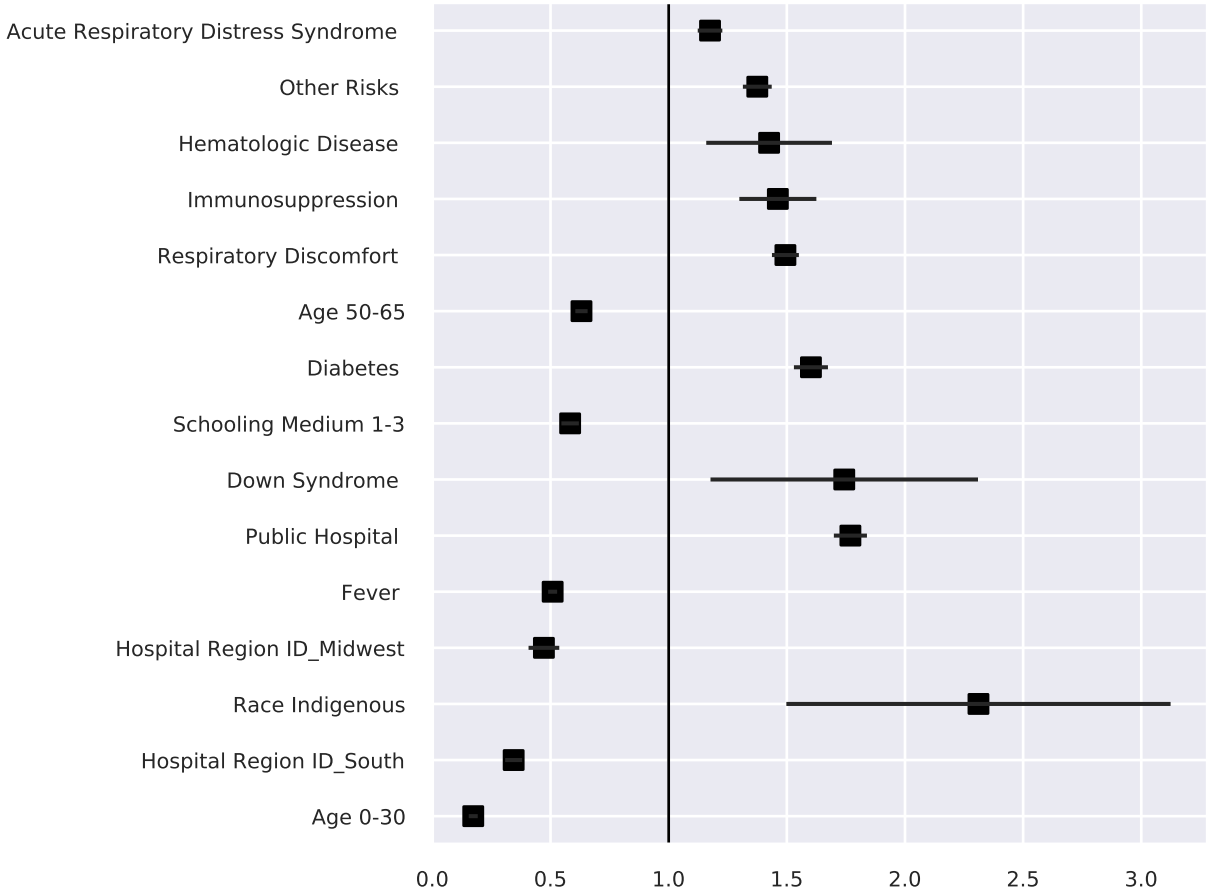
Coefficients:

	SVM-l1	LR-l1
Age 0-30	0.584	0.218
Hospital Region ID_South	0.592	0.244
Hospital Region ID_Midwest	0.664	0.341
Age 30-50	0.696	0.384
Hospital Region ID_Southeast	0.756	0.487
Cough	0.801	0.558
Other Symptoms	0.839	0.628
Schooling Superior	0.853	0.637
Throat	0.876	0.704
Fever	0.885	0.731
Age 50-65	0.904	0.764
Diarrhea	0.919	0.798
Gender_F	0.927	0.815
Race White	0.935	0.839
Schooling Medium 1-3	0.941	0.852
Asthma	0.942	0.858
Postpartum	0.950	0.910
Vomiting	0.998	1.000
Schooling Elem 1-5	1.002	1.005
Acute Respiratory Distress Syndrome	1.030	1.084
Cardiovascular Disease	1.038	1.104
Hematologic Disease	1.093	1.262
Other Risks	1.095	1.271
Dyspnea	1.097	1.272
Respiratory Discomfort	1.101	1.280
Diabetes	1.105	1.287
Another Chronic Pneumopathy	1.142	1.409
Immunosuppression	1.149	1.435
Neurological Disease	1.193	1.577
Public Hospital	1.211	1.646
Contracted At Hospital	1.226	1.708
SpO2 less 95\%	1.256	1.818
Race Indigenous	1.285	1.933
Liver Chronic Disease	1.301	1.968
Age 65-100	1.369	1.992
Renal Chronic Disease	1.322	2.046

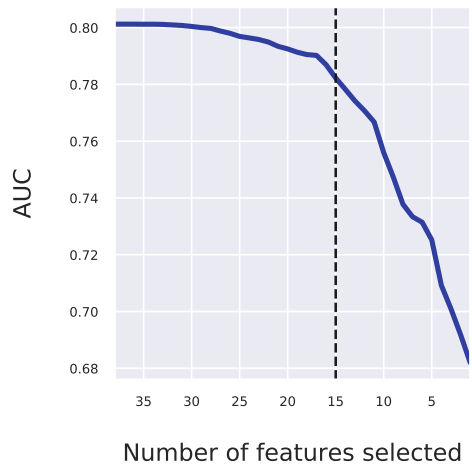

Age 65-100
Age 30-50
SpO2 less 95\%
Hospital Region ID_Southeast
Public Hospital
Cough
Other Symptoms
Age 0-30
Throat
Respiratory Discomfort
Fever
Diabetes
Hospital Region ID_South
Other Risks
Dyspnea
Gender_F
Race White
Age 50-65
Renal Chronic Disease
Cardiovascular Disease
−1.5
−1.0
−0.5
0.0
0.5
SHAP value (impact on model output)
High
Feature value
Low

2.2 Mortality (previous) small

SVM-l1	Coef LR-l1	2.5 err	97.5	Odds Ratio	2.5	97.5	Avg-0	Avg-1	KS-pv	pvalue
Age 0-30	-1.755	-1.870	-1.640	0.173	0.154	0.194	0.482	0.152	0.000	0.000
0.522	0.184	0.019								
Hospital Region ID_South	-1.067	-1.178	-0.956	0.344	0.308	0.384	0.474	0.228	0.000	0.000
0.660	0.361	0.036								
Race Indigenous	0.838	0.404	1.271	2.311	1.498	3.563	0.462	0.667	0.000	0.000
1.409	2.211	0.813								
Hospital Region ID_Midwest	-0.751	-0.899	-0.603	0.472	0.407	0.547	0.466	0.331	0.000	0.000
0.729	0.487	0.065								
Fever	-0.675	-0.713	-0.637	0.509	0.490	0.529	0.557	0.431	0.000	0.000
0.786	0.584	0.019								
Public Hospital	0.570	0.530	0.611	1.769	1.699	1.842	0.405	0.559	0.000	0.000
1.325	1.863	0.070								
Down Syndrome	0.556	0.163	0.949	1.743	1.177	2.583	0.463	0.595	0.029	0.006
1.269	1.739	0.566								
Schooling Medium 1-3	-0.539	-0.606	-0.472	0.583	0.546	0.624	0.477	0.346	0.000	0.000
0.801	0.601	0.037								
Diabetes	0.471	0.425	0.517	1.602	1.530	1.677	0.424	0.579	0.000	0.000
1.264	1.670	0.072								
Age 50-65	-0.460	-0.503	-0.417	0.631	0.605	0.659	0.481	0.420	0.000	0.000
0.830	0.663	0.026								
Respiratory Discomfort	0.401	0.363	0.440	1.494	1.437	1.553	0.394	0.507	0.000	0.000
1.240	1.617	0.057								
Immunosuppression	0.380	0.261	0.498	1.462	1.299	1.645	0.460	0.566	0.000	0.000
1.200	1.510	0.163								
Hematologic Disease	0.354	0.148	0.561	1.425	1.159	1.752	0.462	0.578	0.000	0.001
1.177	1.449	0.266								
Other Risks	0.318	0.273	0.363	1.375	1.314	1.438	0.435	0.543	0.000	0.000
1.181	1.449	0.061								
Acute Respiratory Distress Syndrome	0.161	0.116	0.206	1.175	1.123	1.229	0.447	0.508	0.000	0.000
1.093	1.220	0.052								


Acute Respiratory Distress Syndrome
Other Risks
Hematologic Disease
Immunosuppression
Respiratory Discomfort
Age 50-65
Diabetes
Schooling Medium 1-3
Down Syndrome
Public Hospital
Fever
Hospital Region ID_Midwest
Race Indigenous
Hospital Region ID_South
Age 0-30
0.0
0.5
1.0
1.5
2.0
2.5
3.0

Recursive Feature Elimination:

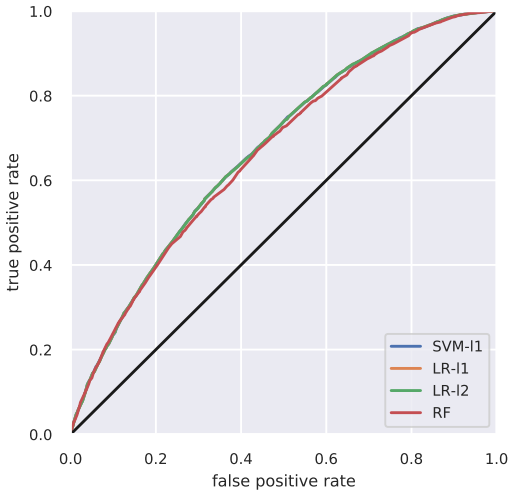


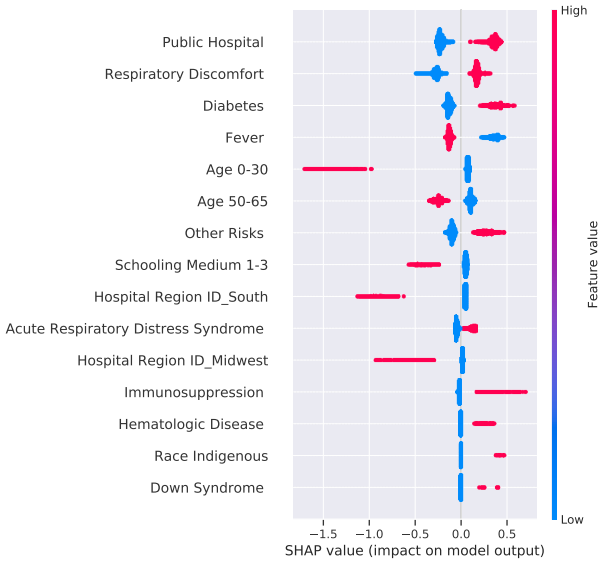
Coefficients:

	SVM-l1	LR-l1
Age 0-30	0.522	0.184
Hospital Region ID_South	0.660	0.361
Hospital Region ID_Midwest	0.729	0.487
Fever	0.786	0.584
Schooling Medium 1-3	0.801	0.601
Age 50-65	0.830	0.663
Acute Respiratory Distress Syndrome	1.093	1.220
Hematologic Disease	1.177	1.449
Other Risks	1.181	1.449
Immunosuppression	1.200	1.510
Respiratory Discomfort	1.240	1.617
Diabetes	1.264	1.670
Down Syndrome	1.269	1.739
Public Hospital	1.325	1.863
Race Indigenous	1.409	2.211

Performance:

	SVM-l1	LR-l1	LR-l2	RF	XGBoos
Accuracy	0.625	0.624	0.624	0.617	0.62
F1w	0.624	0.624	0.624	0.613	0.62
AUC	0.674	0.674	0.674	0.666	0.67

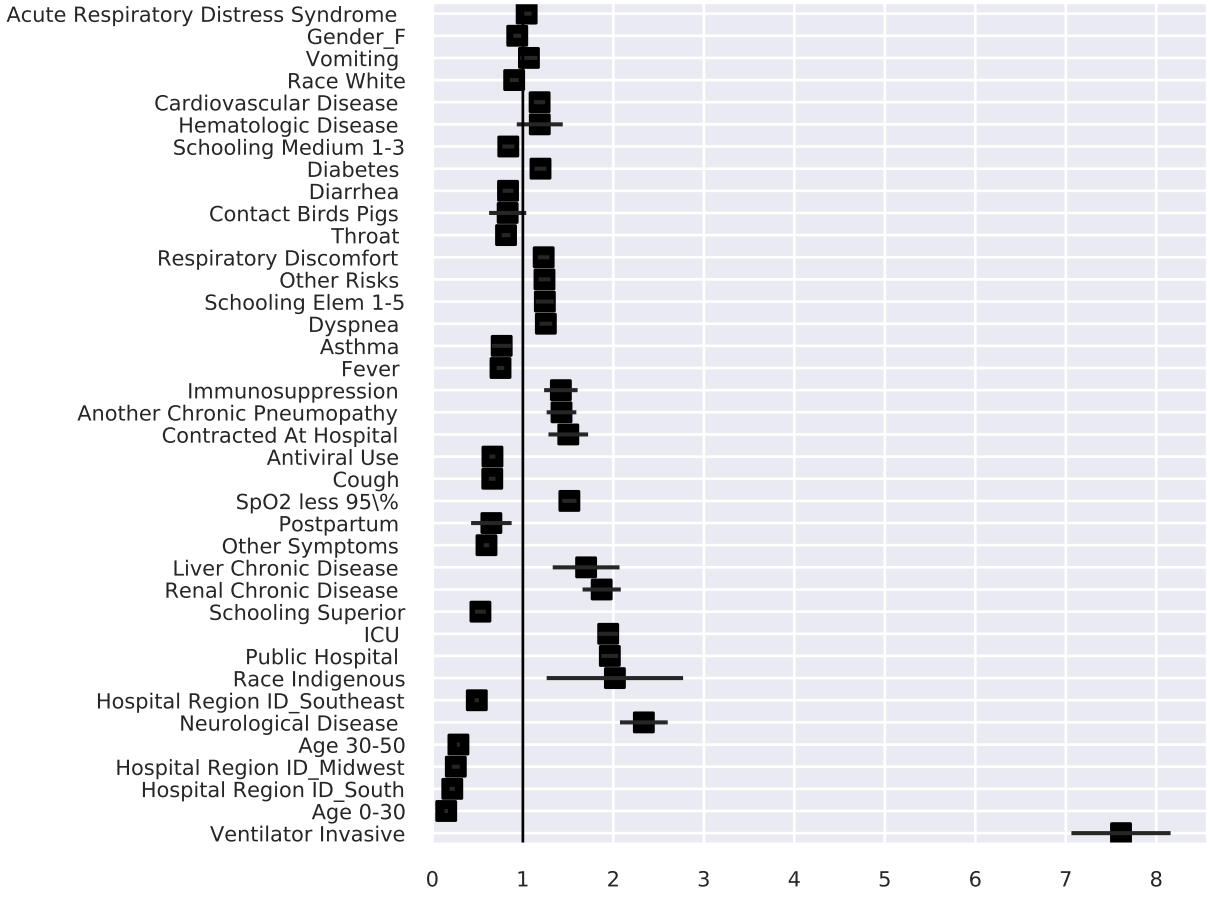




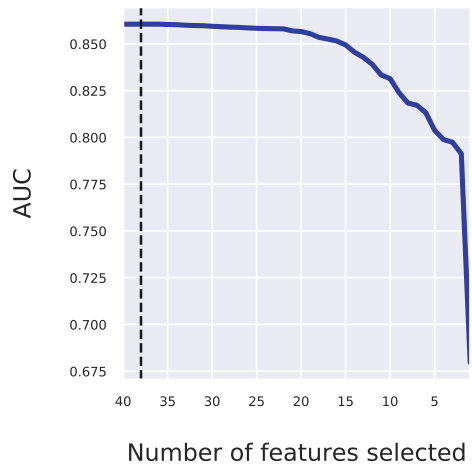
2.3 Mortality (advanced)

Include variables: Antiviral, ICU, Ventilator

	Coef	2.5	97.5	Odds Ratio	2.5	97.5	Avg-0	Avg-1	KS-pv	pvalue
SVM-l1	LR-l1	err								
Ventilator Invasive	2.029	1.955	2.104	7.610	7.062	8.200	0.347	0.857	0.000	0.000
2.084	7.684	0.548								
Age 0-30	-1.877	-2.016	-1.738	0.153	0.133	0.176	0.481	0.151	0.000	0.000
0.522	0.144	0.020								
Hospital Region ID_South	-1.513	-1.654	-1.373	0.220	0.191	0.253	0.474	0.234	0.000	0.000
0.568	0.206	0.029								
Hospital Region ID_Midwest	-1.350	-1.535	-1.165	0.259	0.215	0.312	0.465	0.318	0.000	0.000
0.602	0.245	0.044								
Age 30-50	-1.245	-1.306	-1.183	0.288	0.271	0.306	0.549	0.224	0.000	0.000
0.636	0.276	0.017								
Neurological Disease	0.849	0.729	0.969	2.337	2.073	2.635	0.452	0.692	0.000	0.000
1.385	2.303	0.264								
Hospital Region ID_Southeast	-0.711	-0.762	-0.661	0.491	0.467	0.516	0.531	0.414	0.000	0.000
0.738	0.448	0.024								
Race Indigenous	0.701	0.234	1.169	2.017	1.263	3.219	0.462	0.679	0.000	0.003
1.285	1.821	0.754								
Public Hospital	0.674	0.624	0.723	1.961	1.867	2.060	0.404	0.559	0.000	0.000
1.260	1.857	0.094								
ICU	0.664	0.606	0.722	1.943	1.833	2.059	0.358	0.664	0.000	0.000
1.265	1.883	0.110								
Schooling Superior	-0.633	-0.753	-0.513	0.531	0.471	0.599	0.475	0.254	0.000	0.000
0.802	0.517	0.060								
Renal Chronic Disease	0.627	0.507	0.746	1.871	1.660	2.109	0.451	0.699	0.000	0.000
1.263	1.838	0.211								
Liver Chronic Disease	0.530	0.285	0.775	1.699	1.330	2.171	0.460	0.646	0.000	0.000
1.205	1.647	0.369								
Other Symptoms	-0.514	-0.567	-0.460	0.598	0.567	0.631	0.509	0.355	0.000	0.000
0.816	0.568	0.031								
Postpartum	-0.428	-0.849	-0.006	0.652	0.428	0.994	0.463	0.258	0.000	0.047
0.846	0.663	0.224								
SpO2 less 95\%	0.415	0.361	0.468	1.514	1.435	1.597	0.346	0.541	0.000	0.000
1.154	1.481	0.079								
Cough	-0.412	-0.471	-0.353	0.662	0.625	0.702	0.578	0.429	0.000	0.000
0.827	0.603	0.037								
Antiviral Use	-0.409	-0.461	-0.358	0.664	0.631	0.699	0.476	0.439	0.000	0.000
0.859	0.663	0.033								
Contracted At Hospital	0.407	0.249	0.565	1.502	1.283	1.759	0.458	0.637	0.000	0.000
1.142	1.442	0.219								
Another Chronic Pneumopathy	0.356	0.233	0.478	1.427	1.263	1.613	0.455	0.636	0.000	0.000
1.143	1.413	0.164								
Immunosuppression	0.351	0.211	0.491	1.420	1.235	1.633	0.459	0.559	0.000	0.000
1.125	1.396	0.185								
Fever	-0.284	-0.340	-0.229	0.753	0.712	0.796	0.557	0.430	0.000	0.000
0.872	0.692	0.041								
Asthma	-0.267	-0.417	-0.116	0.766	0.659	0.890	0.465	0.359	0.000	0.001
0.914	0.775	0.107								
Dyspnea	0.226	0.169	0.284	1.254	1.184	1.328	0.376	0.493	0.000	0.000
1.060	1.165	0.070								
Schooling Elem 1-5	0.217	0.131	0.304	1.243	1.140	1.355	0.454	0.556	0.000	0.000
1.079	1.207	0.103								
Other Risks	0.214	0.160	0.269	1.239	1.173	1.309	0.436	0.538	0.000	0.000
1.066	1.197	0.066								
Respiratory Discomfort	0.207	0.154	0.261	1.230	1.166	1.299	0.393	0.506	0.000	0.000
1.069	1.194	0.064								
Throat	-0.205	-0.267	-0.143	0.814	0.766	0.866	0.483	0.384	0.000	0.000
0.926	0.814	0.048								
Contact Birds Pigs	-0.184	-0.467	0.099	0.832	0.627	1.104	0.463	0.369	0.004	0.202
0.945	0.842	0.205								
Diarrhea	-0.180	-0.254	-0.105	0.836	0.776	0.900	0.475	0.377	0.000	0.000
0.935	0.830	0.060								
Diabetes	0.178	0.122	0.234	1.195	1.129	1.264	0.422	0.579	0.000	0.000
1.060	1.170	0.066								
Schooling Medium 1-3	-0.175	-0.258	-0.092	0.839	0.773	0.912	0.476	0.346	0.000	0.000
0.931	0.823	0.066								
Hematologic Disease	0.171	-0.070	0.412	1.187	0.933	1.510	0.461	0.555	0.001	0.163
1.053	1.162	0.254								
Cardiovascular Disease	0.169	0.116	0.223	1.185	1.123	1.249	0.412	0.561	0.000	0.000
1.053	1.152	0.062								
Race White	-0.101	-0.158	-0.043	0.904	0.854	0.958	0.491	0.395	0.000	0.001
0.962	0.893	0.050								
Vomiting	0.065	-0.029	0.159	1.067	0.972	1.173	0.468	0.398	0.000	0.174
1.021	1.061	0.095								
Gender_F	-0.064	-0.112	-0.017	0.938	0.894	0.983	0.472	0.449	0.000	0.008
0.958	0.886	0.044								
Acute Respiratory Distress Syndrome	0.041	-0.013	0.096	1.042	0.987	1.101	0.446	0.508	0.000	0.136
1.001	1.005	0.055								

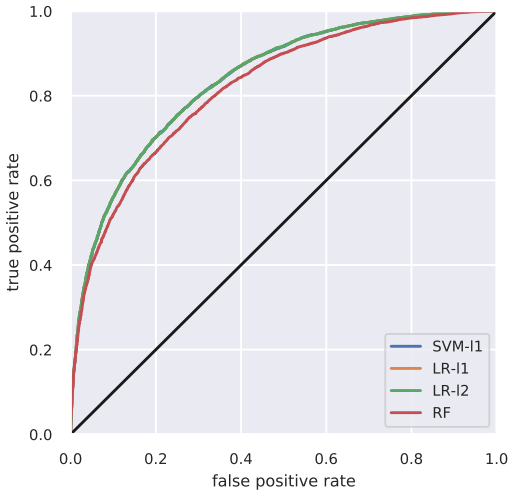

Acute Respiratory Distress Syndrome
Gender_F
Vomiting
Race White
Cardiovascular Disease
Hematologic Disease
Schooling Medium 1-3
Diabetes
Diarrhea
Contact Birds Pigs
Throat
Respiratory Discomfort
Other Risks
Schooling Elem 1-5
Dyspnea
Asthma
Fever
Immunosuppression
Another Chronic Pneumopathy
Contracted At Hospital
Antiviral Use
Cough
SpO2 less 95\%
Postpartum
Other Symptoms
Liver Chronic Disease
Renal Chronic Disease
Schooling Superior
ICU
Public Hospital
Race Indigenous
Hospital Region ID_Southeast
Neurological Disease
Age 30-50
Hospital Region ID_Midwest
Hospital Region ID_South
Age 0-30
Ventilator Invasive
0
1
2
3
4
5
6
7
8

Recursive Feature Elimination:



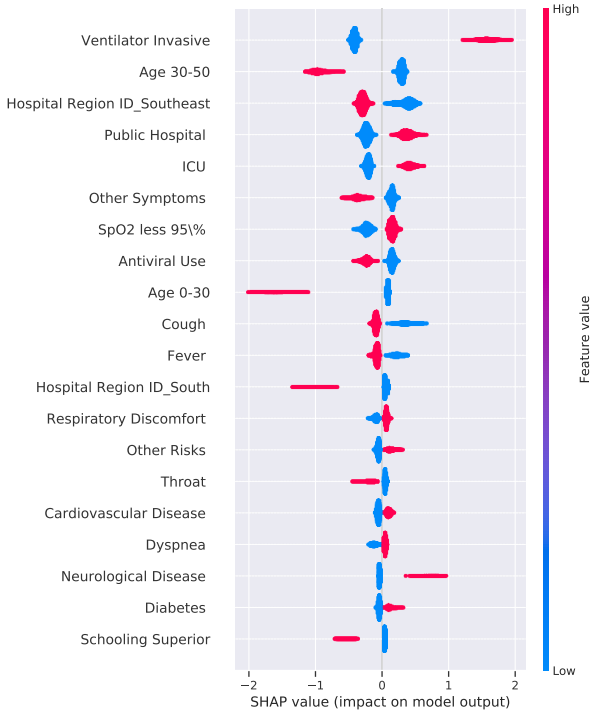
Performance:

	SVM-l1	LR-l1	LR-l2	RF	XGBoost
Accuracy	0.754	0.753	0.753	0.725	0.758
F1w	0.753	0.753	0.753	0.717	0.757
AUC	0.838	0.839	0.839	0.820	0.842



Coefficients:

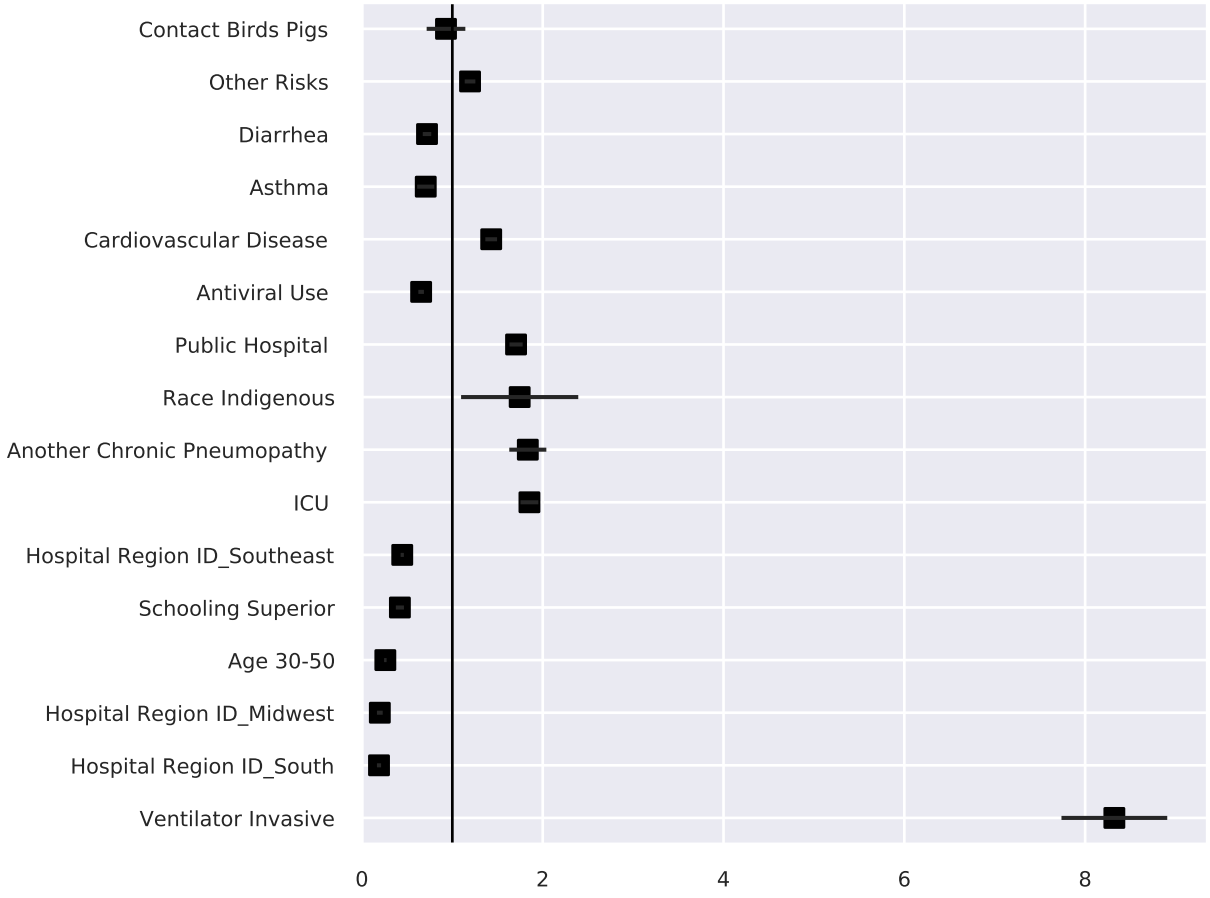
	SVM-l1	LR-l1
Age 0-30	0.522	0.144
Hospital Region ID_South	0.568	0.206
Hospital Region ID_Midwest	0.602	0.245
Age 30-50	0.636	0.276
Hospital Region ID_Southeast	0.738	0.448
Schooling Superior	0.802	0.517
Other Symptoms	0.816	0.568
Cough	0.827	0.603
Postpartum	0.846	0.663
Antiviral Use	0.859	0.663
Fever	0.872	0.692
Asthma	0.914	0.775
Throat	0.926	0.814
Schooling Medium 1-3	0.931	0.823
Diarrhea	0.935	0.830
Contact Birds Pigs	0.945	0.842
Gender_F	0.958	0.886
Race White	0.962	0.893
Acute Respiratory Distress Syndrome	1.001	1.005
Vomiting	1.021	1.061
Cardiovascular Disease	1.053	1.152
Hematologic Disease	1.053	1.162
Dyspnea	1.060	1.165
Diabetes	1.060	1.170
Respiratory Discomfort	1.069	1.194
Other Risks	1.066	1.197
Schooling Elem 1-5	1.079	1.207
Immunosuppression	1.125	1.396
Another Chronic Pneumopathy	1.143	1.413
Contracted At Hospital	1.142	1.442
SpO2 less 95\%	1.154	1.481
Liver Chronic Disease	1.205	1.647
Race Indigenous	1.285	1.821
Renal Chronic Disease	1.263	1.838
Public Hospital	1.260	1.857
ICU	1.265	1.883
Neurological Disease	1.385	2.303
Ventilator Invasive	2.084	7.684


Ventilator Invasive
Age 30-50
Hospital Region ID_Southeast
Public Hospital
ICU
Other Symptoms
SpO2 less 95\%
Antiviral Use
Age 0-30
Cough
Fever
Hospital Region ID_South
Respiratory Discomfort
Other Risks
Throat
Cardiovascular Disease
Dyspnea
Neurological Disease
Diabetes
Schooling Superior
−2
−1
0
1
2
SHAP value (impact on model output)
High
Feature value
Low

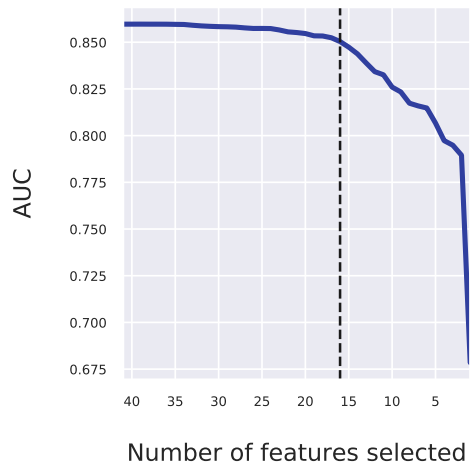
2.4 Mortality (advanced) small

Include variables: Antiviral, ICU, Ventilator

SVM-l1	Coef LR-l1	2.5 err	97.5	Odds Ratio	2.5	97.5	Avg-0	Avg-1	KS-pv	pvalue
Ventilator Invasive	2.119	2.046	2.192	8.323	7.738	8.953	0.348	0.858	0.000	0.000
2.195	8.316	0.585								
Hospital Region ID_South	-1.668	-1.798	-1.538	0.189	0.166	0.215	0.474	0.236	0.000	0.000
0.564	0.203	0.023								
Hospital Region ID_Midwest	-1.620	-1.797	-1.443	0.198	0.166	0.236	0.466	0.315	0.000	0.000
0.567	0.211	0.032								
Age 30-50	-1.349	-1.405	-1.293	0.259	0.245	0.274	0.549	0.222	0.000	0.000
0.629	0.271	0.014								
Schooling Superior	-0.867	-0.981	-0.753	0.420	0.375	0.471	0.475	0.249	0.000	0.000
0.754	0.434	0.045								
Hospital Region ID_Southeast	-0.807	-0.849	-0.766	0.446	0.428	0.465	0.533	0.414	0.000	0.000
0.751	0.479	0.018								
ICU	0.617	0.562	0.672	1.853	1.754	1.958	0.359	0.661	0.000	0.000
1.278	1.900	0.099								
Another Chronic Pneumopathy	0.607	0.489	0.726	1.835	1.630	2.067	0.455	0.650	0.000	0.000
1.276	1.845	0.205								
Race Indigenous	0.557	0.093	1.020	1.745	1.097	2.773	0.462	0.676	0.000	0.019
1.298	1.743	0.648								
Public Hospital	0.534	0.490	0.577	1.705	1.632	1.781	0.407	0.555	0.000	0.000
1.254	1.798	0.073								
Antiviral Use	-0.424	-0.471	-0.376	0.655	0.624	0.687	0.473	0.444	0.000	0.000
0.861	0.672	0.031								
Cardiovascular Disease	0.358	0.311	0.405	1.430	1.365	1.499	0.410	0.566	0.000	0.000
1.163	1.484	0.065								
Asthma	-0.348	-0.493	-0.203	0.706	0.611	0.816	0.466	0.355	0.000	0.000
0.890	0.721	0.095								
Diarrhea	-0.329	-0.396	-0.261	0.720	0.673	0.770	0.476	0.375	0.000	0.000
0.897	0.741	0.047								
Other Risks	0.179	0.129	0.230	1.196	1.137	1.258	0.437	0.536	0.000	0.000
1.083	1.236	0.059								
Contact Birds Pigs	-0.073	-0.333	0.187	0.930	0.716	1.206	0.463	0.390	0.037	0.583
0.993	0.975	0.214								


Contact Birds Pigs
Other Risks
Diarrhea
Asthma
Cardiovascular Disease
Antiviral Use
Public Hospital
Race Indigenous
Another Chronic Pneumopathy
ICU
Hospital Region ID_Southeast
Schooling Superior
Age 30-50
Hospital Region ID_Midwest
Hospital Region ID_South
Ventilator Invasive
0
2
4
6
8

Recursive Feature Elimination:

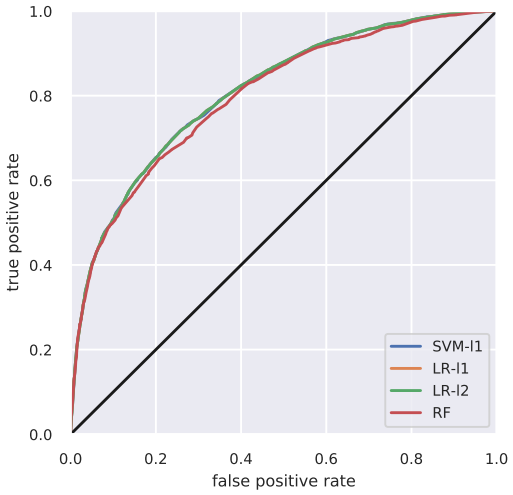


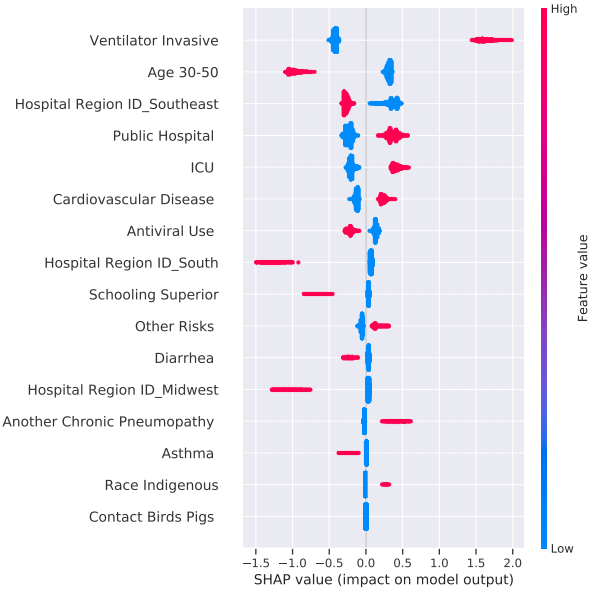
Coefficients:

	SVM-l1	LR-l1
Hospital Region ID_South	0.564	0.203
Hospital Region ID_Midwest	0.567	0.211
Age 30-50	0.629	0.271
Schooling Superior	0.754	0.434
Hospital Region ID_Southeast	0.751	0.479
Antiviral Use	0.861	0.672
Asthma	0.890	0.721
Diarrhea	0.897	0.741
Contact Birds Pigs	0.993	0.975
Other Risks	1.083	1.236
Cardiovascular Disease	1.163	1.484
Race Indigenous	1.298	1.743
Public Hospital	1.254	1.798
Another Chronic Pneumopathy	1.276	1.845
ICU	1.278	1.900
Ventilator Invasive	2.195	8.316

Performance:

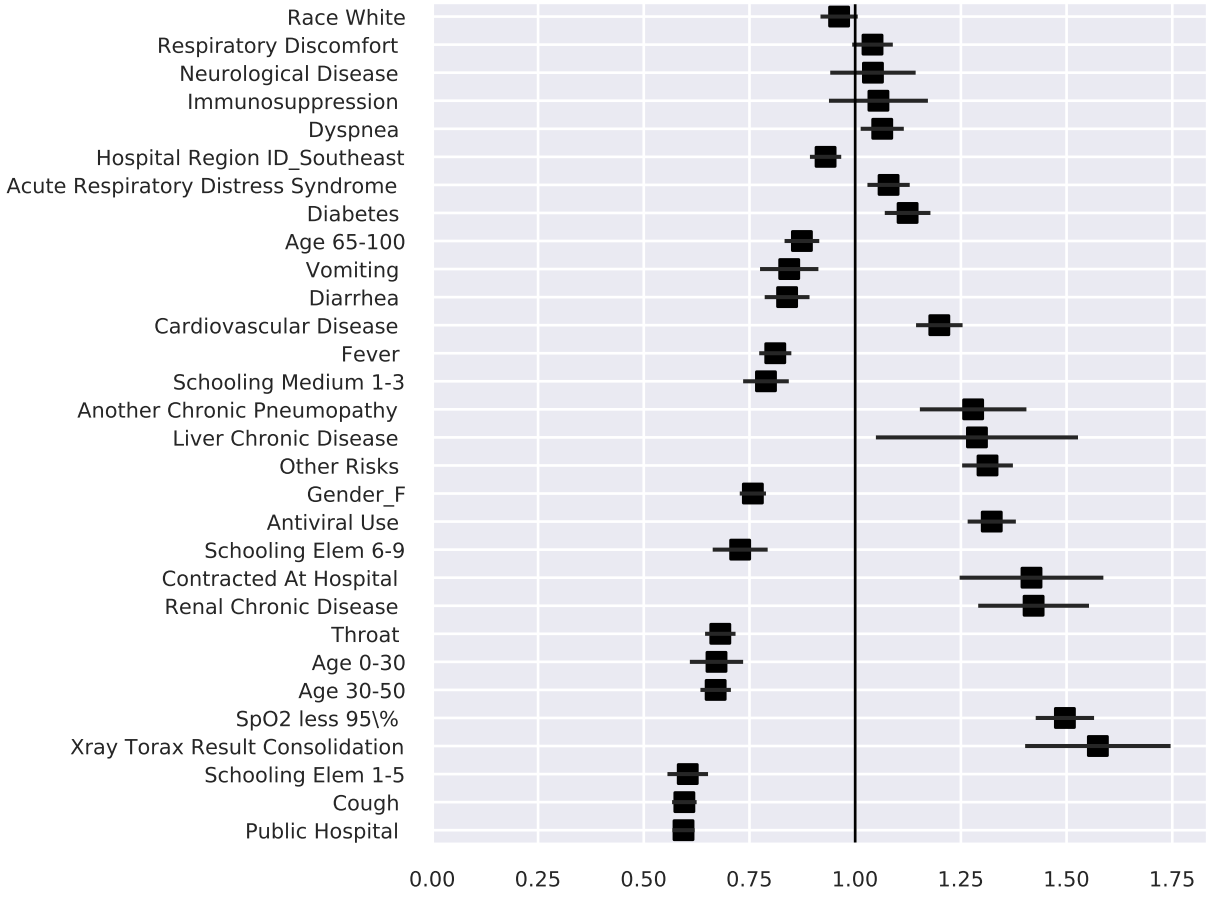
	SVM-l1	LR-l1	LR-l2	RF	XGBoos
Accuracy	0.731	0.730	0.730	0.718	0.73
F1w	0.729	0.729	0.729	0.708	0.73
AUC	0.809	0.809	0.809	0.800	0.81



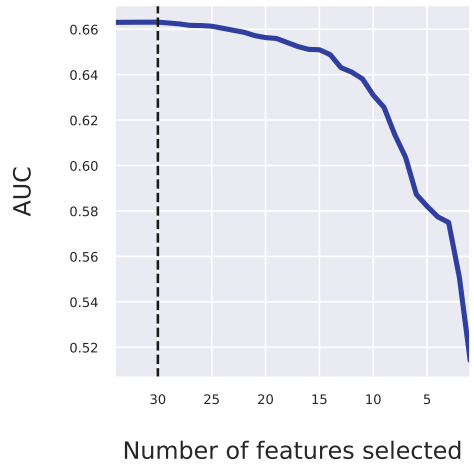


2.5 ICU

SVM-l1	Coef LR-l1	2.5 err	97.5	Odds Ratio	2.5	97.5	Avg-0	Avg-1	KS-pv	pvalue
Public Hospital	-0.521	-0.565	-0.478	0.594	0.568	0.620	0.365	0.293	0.000	0.000
0.840	0.658	0.026								
Cough	-0.518	-0.567	-0.468	0.596	0.567	0.626	0.398	0.321	0.000	0.000
0.863	0.711	0.029								
Schooling Elem 1-5	-0.504	-0.586	-0.421	0.604	0.556	0.656	0.343	0.276	0.000	0.000
0.830	0.632	0.048								
Xray Torax Result Consolidation	0.454	0.338	0.570	1.574	1.402	1.768	0.334	0.469	0.000	0.000
1.244	1.631	0.172								
SpO2 less 95\%	0.403	0.356	0.450	1.496	1.427	1.568	0.262	0.390	0.000	0.000
1.206	1.577	0.069								
Age 30-50	-0.400	-0.455	-0.346	0.670	0.634	0.708	0.361	0.274	0.000	0.000
0.943	0.857	0.036								
Age 0-30	-0.397	-0.496	-0.298	0.672	0.609	0.742	0.343	0.251	0.000	0.000
0.964	0.892	0.063								
Throat	-0.384	-0.439	-0.328	0.681	0.645	0.720	0.358	0.264	0.000	0.000
0.858	0.674	0.036								
Renal Chronic Disease	0.352	0.255	0.449	1.422	1.291	1.567	0.331	0.476	0.000	0.000
1.195	1.476	0.131								
Contracted At Hospital	0.348	0.221	0.476	1.417	1.247	1.609	0.334	0.474	0.000	0.000
1.214	1.534	0.170								
Schooling Elem 6-9	-0.318	-0.411	-0.225	0.728	0.663	0.799	0.340	0.301	0.002	0.000
0.901	0.775	0.065								
Antiviral Use	0.280	0.236	0.323	1.323	1.266	1.382	0.311	0.384	0.000	0.000
1.134	1.352	0.057								
Gender_F	-0.277	-0.318	-0.235	0.758	0.727	0.790	0.349	0.323	0.000	0.000
0.933	0.845	0.031								
Other Risks	0.272	0.226	0.319	1.313	1.253	1.376	0.311	0.414	0.000	0.000
1.166	1.425	0.060								
Liver Chronic Disease	0.253	0.047	0.459	1.288	1.049	1.583	0.337	0.443	0.000	0.016
1.145	1.356	0.239								
Another Chronic Pneumopathy	0.246	0.142	0.349	1.279	1.153	1.418	0.333	0.456	0.000	0.000
1.123	1.283	0.126								
Schooling Medium 1-3	-0.237	-0.308	-0.165	0.789	0.735	0.848	0.344	0.292	0.000	0.000
0.931	0.837	0.054								
Fever	-0.210	-0.257	-0.163	0.811	0.773	0.850	0.364	0.329	0.000	0.000
0.989	0.976	0.038								
Cardiovascular Disease	0.181	0.135	0.228	1.199	1.144	1.256	0.304	0.406	0.000	0.000
1.107	1.266	0.055								
Diarrhea	-0.175	-0.240	-0.110	0.839	0.786	0.895	0.345	0.293	0.000	0.000
0.945	0.868	0.053								
Vomiting	-0.170	-0.255	-0.085	0.844	0.775	0.918	0.342	0.287	0.000	0.000
0.946	0.870	0.069								
Age 65-100	-0.135	-0.182	-0.087	0.874	0.833	0.917	0.302	0.389	0.000	0.000
1.044	1.101	0.041								
Diabetes	0.116	0.067	0.166	1.124	1.070	1.180	0.316	0.403	0.000	0.000
1.076	1.182	0.054								
Acute Respiratory Distress Syndrome	0.076	0.029	0.123	1.079	1.029	1.131	0.328	0.366	0.000	0.002
1.067	1.167	0.050								
Hospital Region ID_Southeast	-0.072	-0.113	-0.031	0.930	0.893	0.969	0.315	0.354	0.000	0.001
1.046	1.119	0.037								
Dyspnea	0.062	0.013	0.112	1.064	1.013	1.118	0.285	0.357	0.000	0.013
1.093	1.246	0.051								
Immunosuppression	0.054	-0.065	0.172	1.055	0.938	1.187	0.336	0.398	0.000	0.374
1.043	1.099	0.117								
Neurological Disease	0.041	-0.061	0.144	1.042	0.941	1.154	0.334	0.420	0.000	0.426
1.016	1.029	0.101								
Respiratory Discomfort	0.040	-0.007	0.086	1.041	0.993	1.090	0.306	0.359	0.000	0.096
1.046	1.109	0.048								
Race White	-0.039	-0.086	0.009	0.962	0.918	1.009	0.333	0.350	0.007	0.108
1.003	1.005	0.044								

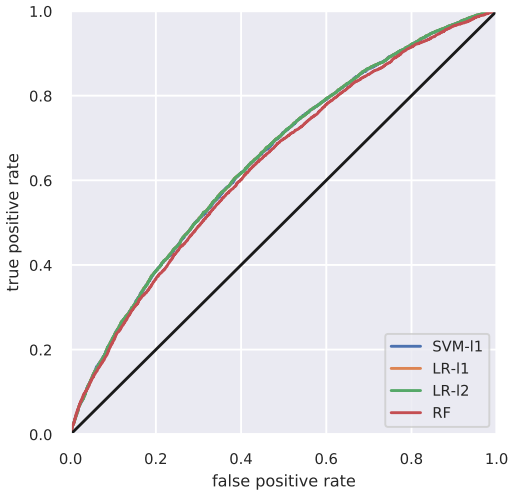

Race White
Respiratory Discomfort
Neurological Disease
Immunosuppression
Dyspnea
Hospital Region ID_Southeast
Acute Respiratory Distress Syndrome
Diabetes
Age 65-100
Vomiting
Diarrhea
Cardiovascular Disease
Fever
Schooling Medium 1-3
Another Chronic Pneumopathy
Liver Chronic Disease
Other Risks
Gender_F
Antiviral Use
Schooling Elem 6-9
Contracted At Hospital
Renal Chronic Disease
Throat
Age 0-30
Age 30-50
SpO2 less 95\%
Xray Torax Result Consolidation
Schooling Elem 1-5
Cough
Public Hospital
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75

Recursive Feature Elimination:



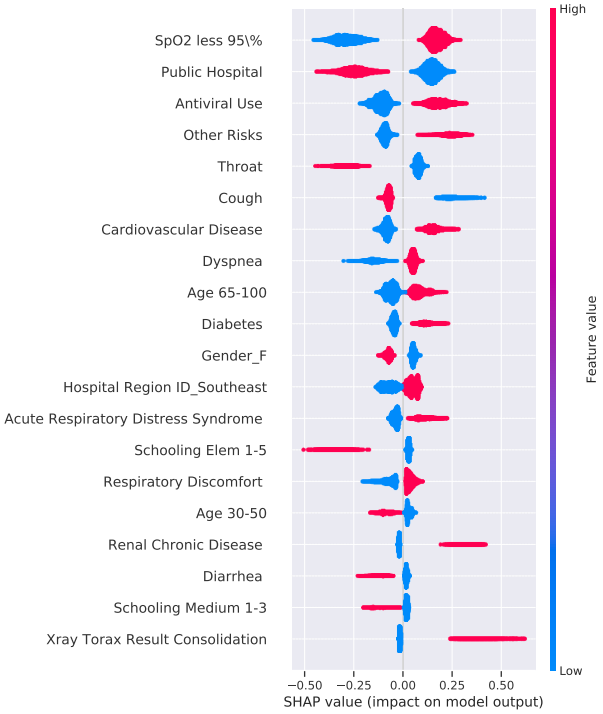
Performance:

	SVM-l1	LR-l1	LR-l2	RF	XGBoost
Accuracy	0.648	0.648	0.648	0.626	0.650
F1w	0.592	0.594	0.594	0.483	0.595
AUC	0.652	0.652	0.652	0.641	0.658



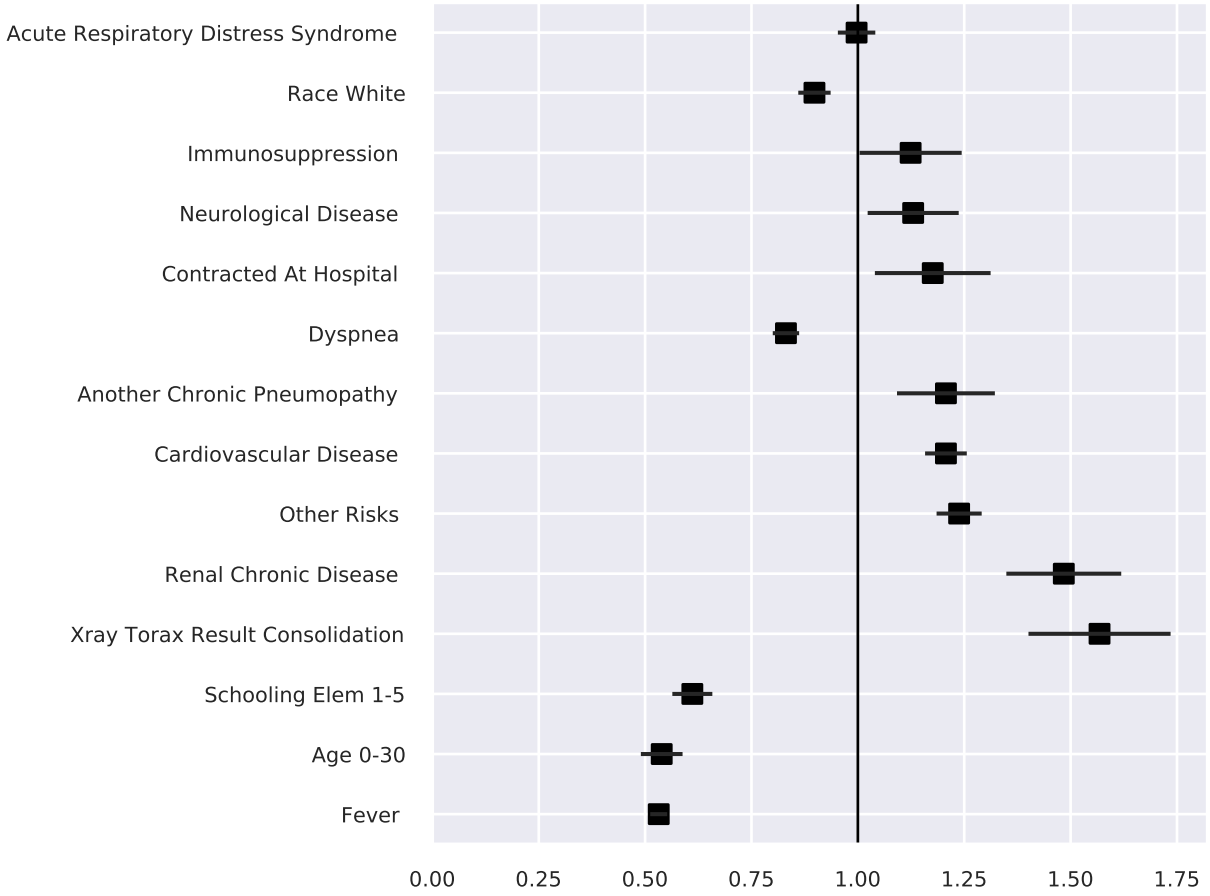
Coefficients:

	SVM-l1	LR-l1
Schooling Elem 1-5	0.830	0.632
Public Hospital	0.840	0.658
Throat	0.858	0.674
Cough	0.863	0.711
Schooling Elem 6-9	0.901	0.775
Schooling Medium 1-3	0.931	0.837
Gender_F	0.933	0.845
Age 30-50	0.943	0.857
Diarrhea	0.945	0.868
Vomiting	0.946	0.870
Age 0-30	0.964	0.892
Fever	0.989	0.976
Race White	1.003	1.005
Neurological Disease	1.016	1.029
Immunosuppression	1.043	1.099
Age 65-100	1.044	1.101
Respiratory Discomfort	1.046	1.109
Hospital Region ID_Southeast	1.046	1.119
Acute Respiratory Distress Syndrome	1.067	1.167
Diabetes	1.076	1.182
Dyspnea	1.093	1.246
Cardiovascular Disease	1.107	1.266
Another Chronic Pneumopathy	1.123	1.283
Antiviral Use	1.134	1.352
Liver Chronic Disease	1.145	1.356
Other Risks	1.166	1.425
Renal Chronic Disease	1.195	1.476
Contracted At Hospital	1.214	1.534
SpO2 less 95\%	1.206	1.577
Xray Torax Result Consolidation	1.244	1.631

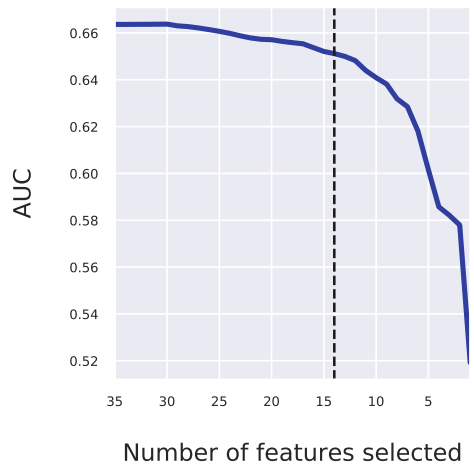

SpO2 less 95\%
Public Hospital
Antiviral Use
Other Risks
Throat
Cough
Cardiovascular Disease
Dyspnea
Age 65-100
Diabetes
Gender_F
Hospital Region ID_Southeast
Acute Respiratory Distress Syndrome
Schooling Elem 1-5
Respiratory Discomfort
Age 30-50
Renal Chronic Disease
Diarrhea
Schooling Medium 1-3
Xray Torax Result Consolidation
−0.50
−0.25
0.00
0.25
0.50
SHAP value (impact on model output)
High
Feature value
Low

2.6 ICU small

SVM-l1	Coef LR-l1	2.5 err	97.5	Odds Ratio	2.5	97.5	Avg-0	Avg-1	KS-pv	pvalue
Fever	-0.631	-0.669	-0.593	0.532	0.512	0.552	0.368	0.331	0.0	0.000
0.937	0.863	0.020								
Age 0-30	-0.619	-0.714	-0.523	0.539	0.490	0.593	0.347	0.240	0.0	0.000
0.878	0.713	0.049								
Schooling Elem 1-5	-0.493	-0.573	-0.414	0.611	0.564	0.661	0.345	0.285	0.0	0.000
0.846	0.673	0.047								
Xray Torax Result Consolidation	0.450	0.337	0.563	1.568	1.401	1.756	0.336	0.473	0.0	0.000
1.280	1.699	0.167								
Renal Chronic Disease	0.394	0.300	0.489	1.484	1.349	1.631	0.334	0.492	0.0	0.000
1.255	1.616	0.135								
Other Risks	0.214	0.170	0.258	1.238	1.185	1.294	0.314	0.416	0.0	0.000
1.205	1.516	0.053								
Cardiovascular Disease	0.188	0.147	0.230	1.207	1.158	1.259	0.306	0.410	0.0	0.000
1.187	1.467	0.049								
Another Chronic Pneumopathy	0.188	0.088	0.288	1.207	1.092	1.334	0.336	0.440	0.0	0.000
1.124	1.282	0.115								
Dyspnea	-0.185	-0.224	-0.146	0.831	0.800	0.864	0.290	0.359	0.0	0.000
1.129	1.334	0.031								
Contracted At Hospital	0.162	0.039	0.285	1.176	1.040	1.330	0.338	0.446	0.0	0.010
1.142	1.334	0.136								
Neurological Disease	0.123	0.023	0.222	1.130	1.023	1.249	0.337	0.417	0.0	0.016
1.082	1.185	0.107								
Immunosuppression	0.117	0.004	0.230	1.124	1.004	1.259	0.338	0.421	0.0	0.042
1.102	1.237	0.120								
Race White	-0.108	-0.151	-0.065	0.898	0.860	0.937	0.334	0.356	0.0	0.000
1.040	1.093	0.038								
Acute Respiratory Distress Syndrome	-0.003	-0.048	0.043	0.997	0.953	1.044	0.331	0.368	0.0	0.911
1.066	1.157	0.044								


Acute Respiratory Distress Syndrome
Race White
Immunosuppression
Neurological Disease
Contracted At Hospital
Dyspnea
Another Chronic Pneumopathy
Cardiovascular Disease
Other Risks
Renal Chronic Disease
Xray Torax Result Consolidation
Schooling Elem 1-5
Age 0-30
Fever
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75

Recursive Feature Elimination:

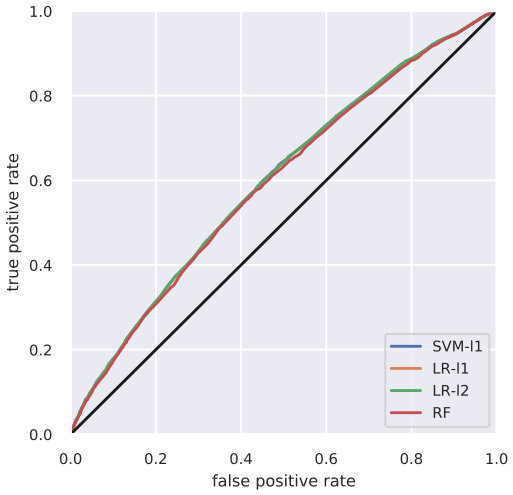


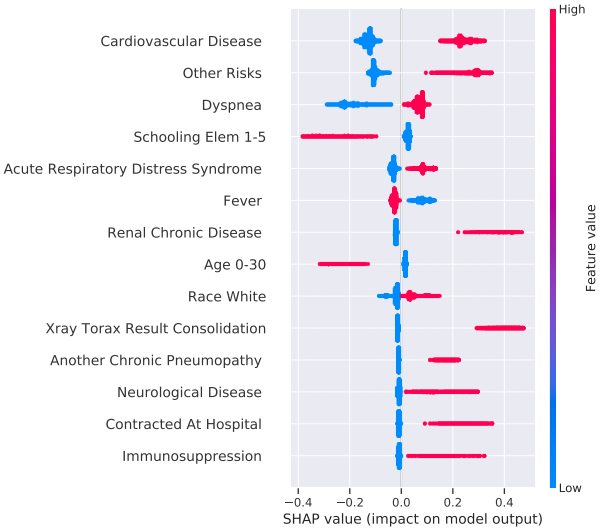
Coefficients:

	SVM-l1	LR-l1
Schooling Elem 1-5	0.846	0.673
Age 0-30	0.878	0.713
Fever	0.937	0.863
Race White	1.040	1.093
Acute Respiratory Distress Syndrome	1.066	1.157
Neurological Disease	1.082	1.185
Immunosuppression	1.102	1.237
Another Chronic Pneumopathy	1.124	1.282
Contracted At Hospital	1.142	1.334
Dyspnea	1.129	1.334
Cardiovascular Disease	1.187	1.467
Other Risks	1.205	1.516
Renal Chronic Disease	1.255	1.616
Xray Torax Result Consolidation	1.280	1.699

Performance:

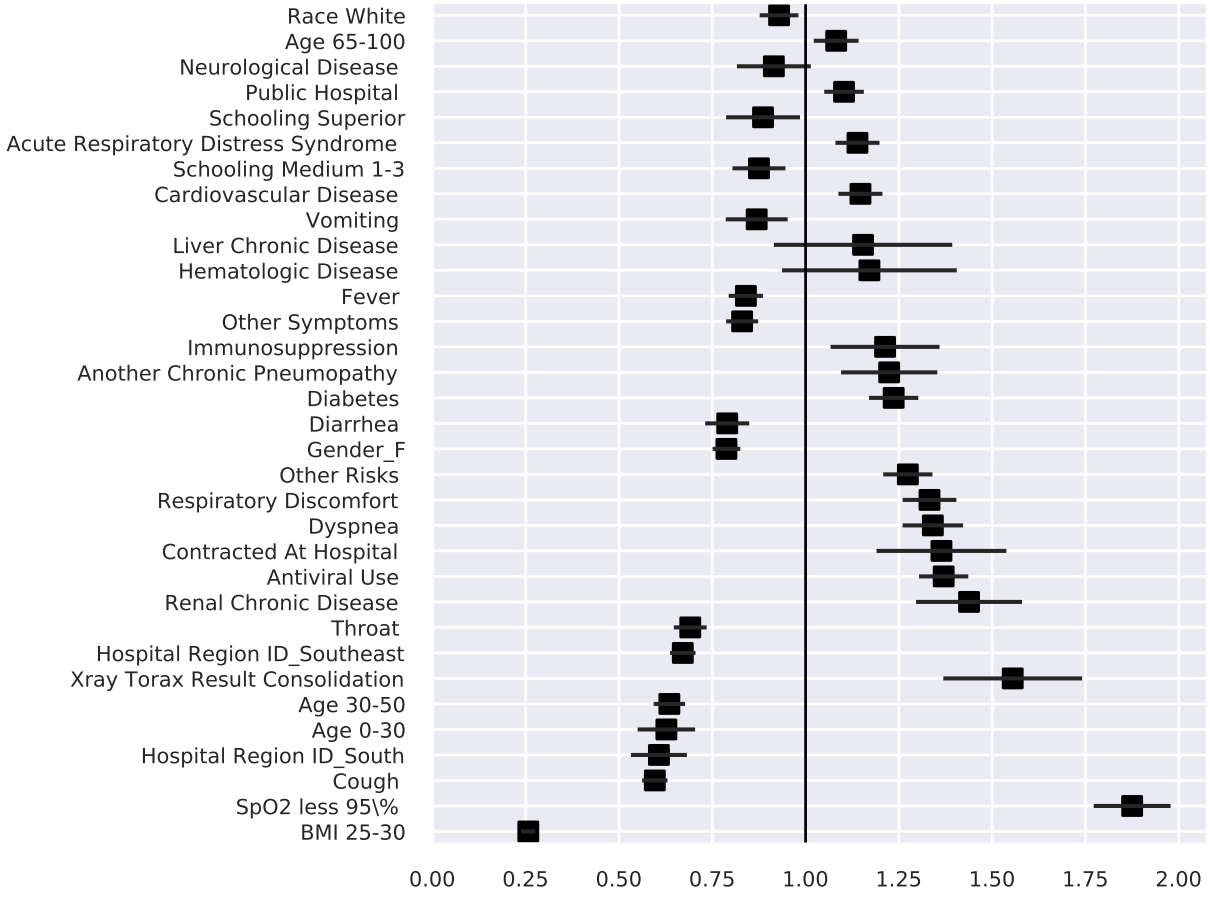
	SVM-l1	LR-l1	LR-l2	RF	XGBoos
Accuracy	0.641	0.640	0.640	0.635	0.64
F1w	0.550	0.549	0.549	0.494	0.53
AUC	0.601	0.601	0.601	0.595	0.60



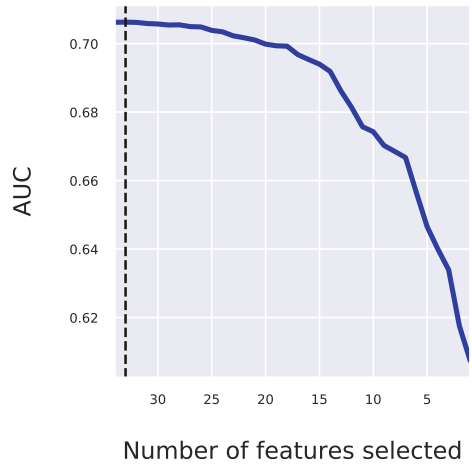


2.7 Ventilator

SVM-l1	Coef LR-l1	2.5 err	97.5	Odds Ratio	2.5	97.5	Avg-0	Avg-1	KS-pv	pvalue
BMI 25-30	-1.360	-1.437	-1.282	0.257	0.238	0.277	0.348	0.220	0.000	0.000
0.793	0.530	0.019								
SpO2 less 95\%	0.628	0.572	0.685	1.875	1.772	1.984	0.132	0.287	0.000	0.000
1.224	1.960	0.103								
Cough	-0.518	-0.575	-0.460	0.596	0.562	0.631	0.278	0.208	0.000	0.000
0.856	0.639	0.034								
Hospital Region ID_South	-0.499	-0.631	-0.366	0.607	0.532	0.693	0.226	0.174	0.000	0.000
0.880	0.663	0.075								
Age 0-30	-0.467	-0.598	-0.336	0.627	0.550	0.714	0.230	0.129	0.000	0.000
0.920	0.708	0.077								
Age 30-50	-0.454	-0.523	-0.384	0.635	0.593	0.681	0.253	0.145	0.000	0.000
0.914	0.711	0.042								
Xray Torax Result Consolidation	0.442	0.314	0.569	1.555	1.369	1.767	0.221	0.317	0.000	0.000
1.176	1.565	0.186								
Hospital Region ID_Southeast	-0.399	-0.450	-0.348	0.671	0.637	0.706	0.249	0.206	0.000	0.000
0.902	0.732	0.034								
Throat	-0.370	-0.435	-0.305	0.691	0.647	0.737	0.237	0.176	0.000	0.000
0.890	0.687	0.044								
Renal Chronic Disease	0.363	0.259	0.467	1.438	1.296	1.596	0.218	0.353	0.000	0.000
1.162	1.461	0.142								
Antiviral Use	0.315	0.265	0.365	1.370	1.304	1.440	0.200	0.266	0.000	0.000
1.111	1.381	0.066								
Contracted At Hospital	0.311	0.174	0.448	1.364	1.190	1.565	0.221	0.322	0.000	0.000
1.136	1.406	0.174								
Dyspnea	0.293	0.231	0.355	1.341	1.260	1.426	0.144	0.253	0.000	0.000
1.119	1.467	0.081								
Respiratory Discomfort	0.287	0.231	0.342	1.332	1.260	1.408	0.160	0.264	0.000	0.000
1.115	1.384	0.072								
Other Risks	0.242	0.189	0.295	1.274	1.208	1.343	0.205	0.278	0.000	0.000
1.096	1.311	0.066								
Gender_F	-0.238	-0.286	-0.189	0.788	0.751	0.828	0.235	0.209	0.000	0.000
0.941	0.829	0.037								
Diarrhea	-0.236	-0.314	-0.158	0.790	0.731	0.854	0.231	0.178	0.000	0.000
0.935	0.802	0.059								
Diabetes	0.212	0.157	0.266	1.236	1.170	1.305	0.199	0.296	0.000	0.000
1.091	1.273	0.066								
Another Chronic Pneumopathy	0.202	0.091	0.313	1.224	1.095	1.367	0.220	0.324	0.000	0.000
1.086	1.228	0.129								
Immunosuppression	0.193	0.065	0.321	1.213	1.067	1.378	0.222	0.284	0.000	0.003
1.067	1.221	0.146								
Other Symptoms	-0.186	-0.240	-0.132	0.830	0.787	0.877	0.237	0.194	0.000	0.000
0.961	0.880	0.043								
Fever	-0.174	-0.230	-0.118	0.840	0.794	0.889	0.252	0.214	0.000	0.000
0.963	0.904	0.046								
Hematologic Disease	0.158	-0.065	0.381	1.171	0.937	1.463	0.223	0.293	0.030	0.166
1.058	1.159	0.234								
Liver Chronic Disease	0.144	-0.089	0.376	1.154	0.915	1.457	0.223	0.309	0.007	0.227
1.067	1.175	0.239								
Vomiting	-0.141	-0.241	-0.040	0.869	0.786	0.961	0.227	0.180	0.000	0.006
0.959	0.880	0.083								
Cardiovascular Disease	0.137	0.084	0.190	1.147	1.088	1.210	0.196	0.279	0.000	0.000
1.058	1.187	0.059								
Schooling Medium 1-3	-0.134	-0.218	-0.050	0.875	0.804	0.951	0.229	0.184	0.000	0.002
0.971	0.906	0.071								
Acute Respiratory Distress Syndrome	0.130	0.077	0.184	1.139	1.080	1.202	0.211	0.261	0.000	0.000
1.057	1.176	0.059								
Schooling Superior	-0.121	-0.239	-0.003	0.886	0.787	0.997	0.227	0.169	0.000	0.044
0.985	0.930	0.099								
Public Hospital	0.098	0.049	0.147	1.103	1.050	1.158	0.204	0.258	0.000	0.000
1.047	1.156	0.053								
Neurological Disease	-0.088	-0.203	0.027	0.915	0.816	1.027	0.222	0.262	0.010	0.131
0.961	0.908	0.099								
Age 65-100	0.079	0.022	0.136	1.082	1.022	1.145	0.182	0.283	0.000	0.006
1.058	1.169	0.060								
Race White	-0.074	-0.132	-0.016	0.929	0.877	0.984	0.231	0.207	0.000	0.012
0.981	0.940	0.052								

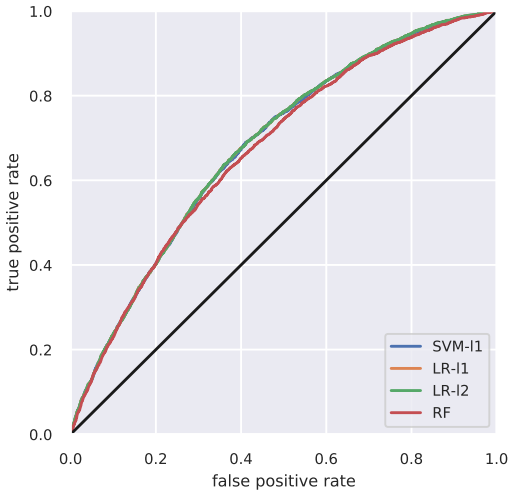

Race White
Age 65-100
Neurological Disease
Public Hospital
Schooling Superior
Acute Respiratory Distress Syndrome
Schooling Medium 1-3
Cardiovascular Disease
Vomiting
Liver Chronic Disease
Hematologic Disease
Fever
Other Symptoms
Immunosuppression
Another Chronic Pneumopathy
Diabetes
Diarrhea
Gender_F
Other Risks
Respiratory Discomfort
Dyspnea
Contracted At Hospital
Antiviral Use
Renal Chronic Disease
Throat
Hospital Region ID_Southeast
Xray Torax Result Consolidation
Age 30-50
Age 0-30
Hospital Region ID_South
Cough
SpO2 less 95\%
BMI 25-30
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00

Recursive Feature Elimination:



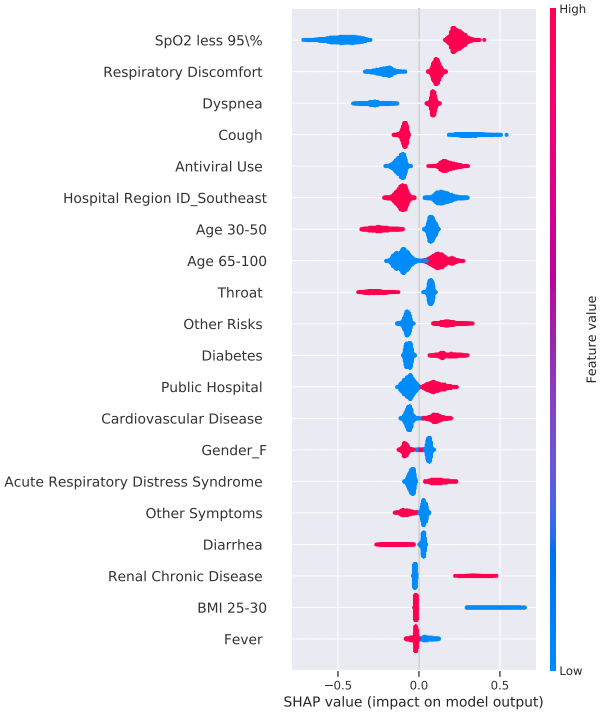
Performance:

	SVM-l1	LR-l1	LR-l2	RF	XGBoost
Accuracy	0.750	0.750	0.750	0.749	0.752
F1w	0.674	0.672	0.672	0.641	0.669
AUC	0.681	0.682	0.682	0.673	0.687



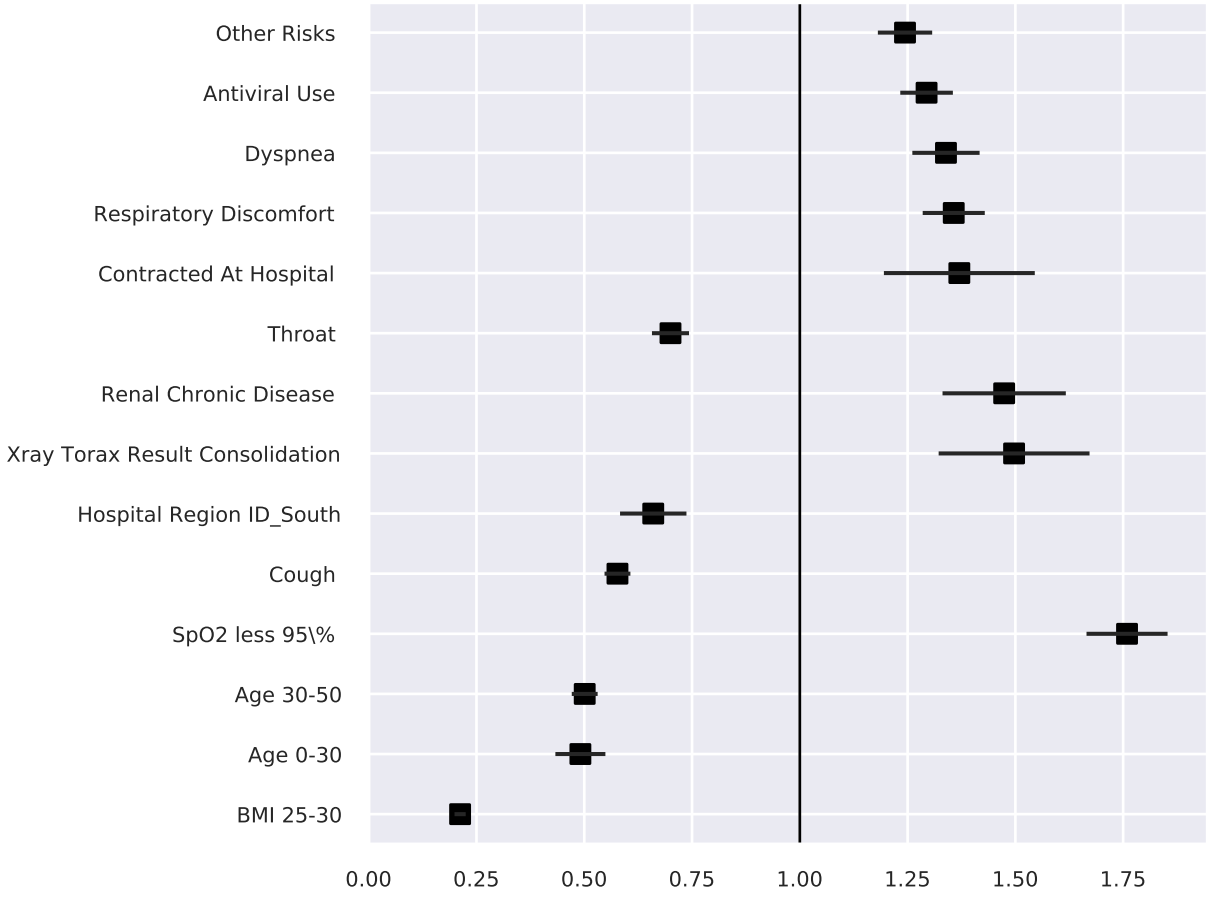
Coefficients:

	SVM-l1	LR-l1
BMI 25-30	0.793	0.530
Cough	0.856	0.639
Hospital Region ID_South	0.880	0.663
Throat	0.890	0.687
Age 0-30	0.920	0.708
Age 30-50	0.914	0.711
Hospital Region ID_Southeast	0.902	0.732
Diarrhea	0.935	0.802
Gender_F	0.941	0.829
Other Symptoms	0.961	0.880
Vomiting	0.959	0.880
Fever	0.963	0.904
Schooling Medium 1-3	0.971	0.906
Neurological Disease	0.961	0.908
Schooling Superior	0.985	0.930
Race White	0.981	0.940
Public Hospital	1.047	1.156
Hematologic Disease	1.058	1.159
Age 65-100	1.058	1.169
Liver Chronic Disease	1.067	1.175
Acute Respiratory Distress Syndrome	1.057	1.176
Cardiovascular Disease	1.058	1.187
Immunosuppression	1.067	1.221
Another Chronic Pneumopathy	1.086	1.228
Diabetes	1.091	1.273
Other Risks	1.096	1.311
Antiviral Use	1.111	1.381
Respiratory Discomfort	1.115	1.384
Contracted At Hospital	1.136	1.406
Renal Chronic Disease	1.162	1.461
Dyspnea	1.119	1.467
Xray Torax Result Consolidation	1.176	1.565
SpO2 less 95\%	1.224	1.960

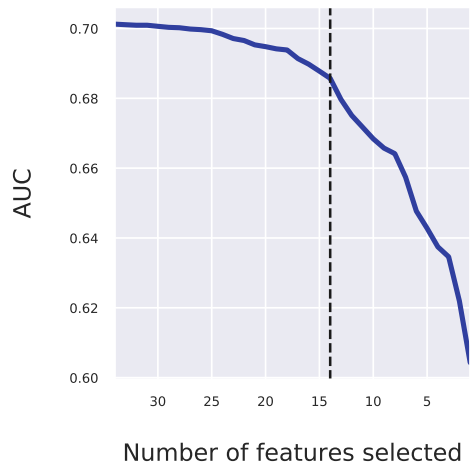

SpO2 less 95\%
Respiratory Discomfort
Dyspnea
Cough
Antiviral Use
Hospital Region ID_Southeast
Age 30-50
Age 65-100
Throat
Other Risks
Diabetes
Public Hospital
Cardiovascular Disease
Gender_F
Acute Respiratory Distress Syndrome
Other Symptoms
Diarrhea
Renal Chronic Disease
BMI 25-30
Fever
−0.5
0.0
0.5
SHAP value (impact on model output)
High
Feature value
Low

2.8 Ventilator small

SVM-l1	Coef LR-l1	2.5 err	97.5	Odds Ratio	2.5	97.5	Avg-0	Avg-1	KS-pv	pvalue
BMI 25-30	-1.553	-1.615	-1.492	0.212	0.199	0.225	0.338	0.222	0.0	0.0
0.819	0.585	0.013								
Age 0-30	-0.711	-0.836	-0.586	0.491	0.433	0.557	0.232	0.127	0.0	0.0
0.843	0.542	0.058								
Age 30-50	-0.692	-0.752	-0.632	0.501	0.471	0.531	0.255	0.143	0.0	0.0
0.839	0.553	0.030								
SpO2 less 95\%	0.565	0.510	0.619	1.759	1.665	1.857	0.136	0.287	0.0	0.0
1.222	1.916	0.094								
Cough	-0.551	-0.604	-0.497	0.577	0.547	0.608	0.274	0.212	0.0	0.0
0.861	0.652	0.030								
Hospital Region ID_South	-0.416	-0.539	-0.292	0.660	0.583	0.747	0.228	0.171	0.0	0.0
0.897	0.700	0.077								
Xray Torax Result Consolidation	0.403	0.279	0.528	1.497	1.322	1.695	0.223	0.316	0.0	0.0
1.171	1.532	0.175								
Renal Chronic Disease	0.388	0.286	0.490	1.474	1.331	1.633	0.220	0.347	0.0	0.0
1.188	1.547	0.143								
Throat	-0.357	-0.420	-0.293	0.700	0.657	0.746	0.237	0.181	0.0	0.0
0.895	0.701	0.043								
Contracted At Hospital	0.315	0.178	0.451	1.370	1.195	1.570	0.223	0.322	0.0	0.0
1.149	1.441	0.175								
Respiratory Discomfort	0.305	0.251	0.360	1.357	1.285	1.433	0.163	0.266	0.0	0.0
1.125	1.426	0.072								
Dyspnea	0.292	0.232	0.352	1.339	1.261	1.422	0.148	0.254	0.0	0.0
1.132	1.516	0.078								
Antiviral Use	0.258	0.209	0.306	1.294	1.233	1.358	0.203	0.265	0.0	0.0
1.103	1.343	0.061								
Other Risks	0.218	0.167	0.269	1.244	1.181	1.309	0.206	0.282	0.0	0.0
1.103	1.320	0.063								


Other Risks
Antiviral Use
Dyspnea
Respiratory Discomfort
Contracted At Hospital
Throat
Renal Chronic Disease
Xray Torax Result Consolidation
Hospital Region ID_South
Cough
SpO2 less 95\%
Age 30-50
Age 0-30
BMI 25-30
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75

Recursive Feature Elimination:

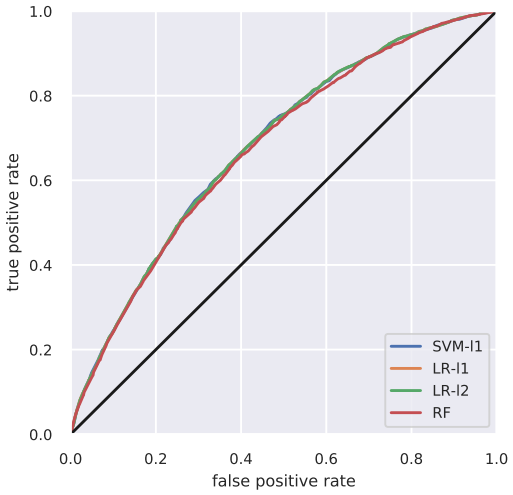


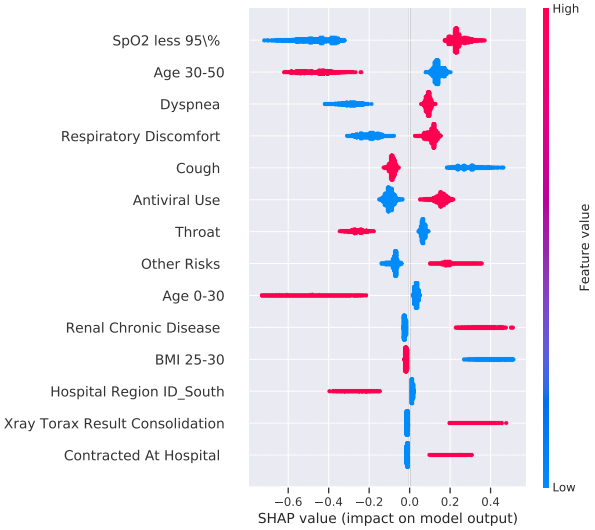
Coefficients:

	SVM-l1	LR-l1
Age 0-30	0.843	0.542
Age 30-50	0.839	0.553
BMI 25-30	0.819	0.585
Cough	0.861	0.652
Hospital Region ID_South	0.897	0.700
Throat	0.895	0.701
Other Risks	1.103	1.320
Antiviral Use	1.103	1.343
Respiratory Discomfort	1.125	1.426
Contracted At Hospital	1.149	1.441
Dyspnea	1.132	1.516
Xray Torax Result Consolidation	1.171	1.532
Renal Chronic Disease	1.188	1.547
SpO2 less 95\%	1.222	1.916

Performance:

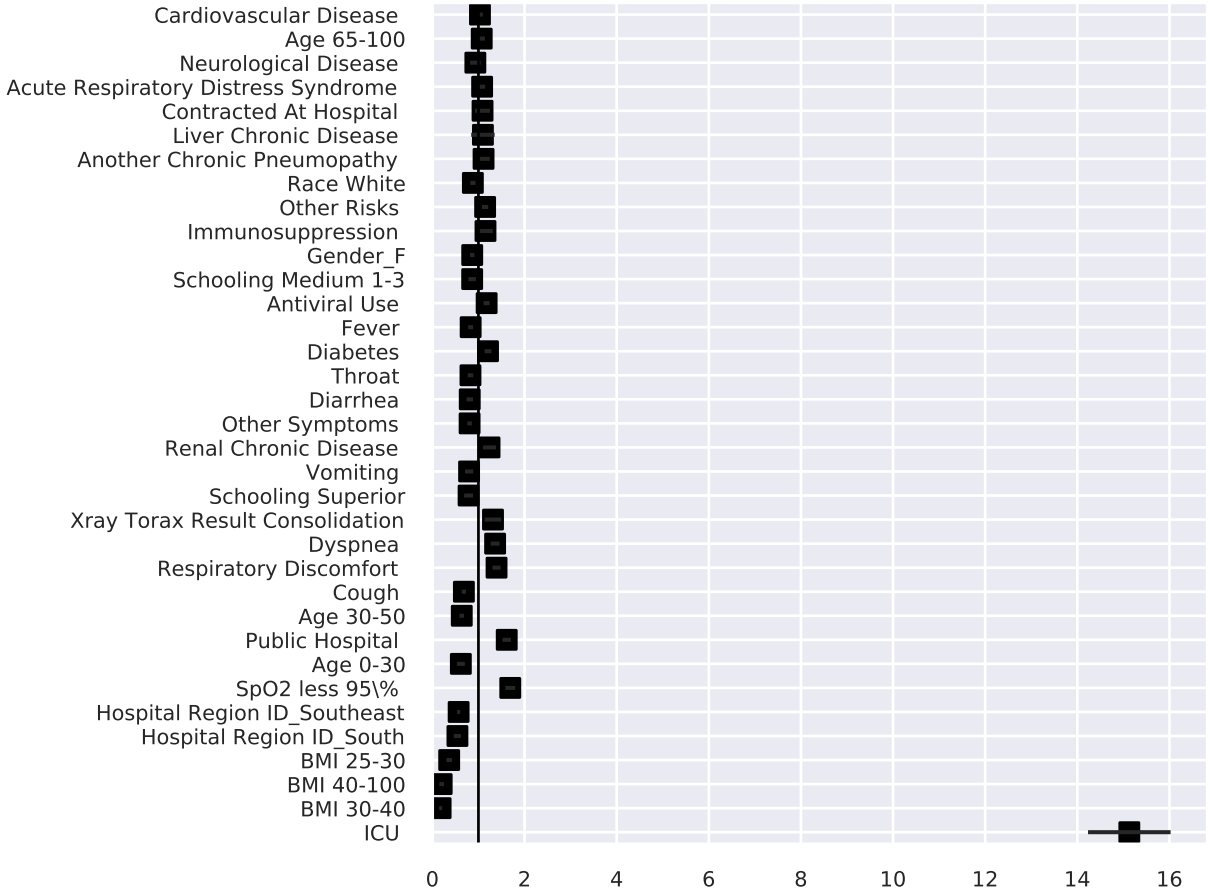
	SVM-l1	LR-l1	LR-l2	RF	XGBoos
Accuracy	0.756	0.756	0.756	0.753	0.75
F1w	0.671	0.668	0.668	0.647	0.65
AUC	0.681	0.681	0.681	0.675	0.68



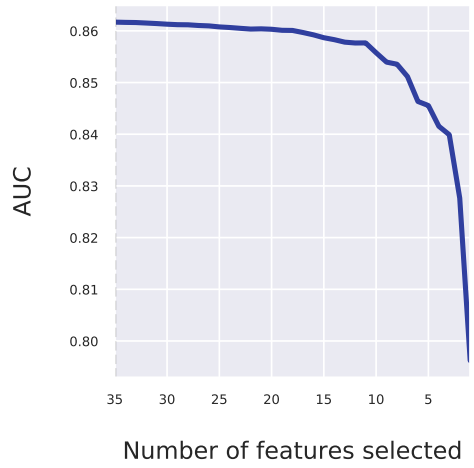


2.9 Ventilator with ICU

SVM-l1	Coef LR-l1	2.5 err	97.5	Odds Ratio	2.5	97.5	Avg-0	Avg-1	KS-pv	pvalue
ICU	2.717	2.656	2.778	15.128	14.232	16.079	0.067	0.523	0.000	0.000
2.480	15.786	0.896								
BMI 30-40	-1.720	-1.922	-1.518	0.179	0.146	0.219	0.307	0.223	0.002	0.000
1.089	1.235	0.033								
BMI 40-100	-1.598	-1.884	-1.312	0.202	0.152	0.269	0.222	0.368	0.000	0.000
1.057	1.156	0.050								
BMI 25-30	-1.007	-1.186	-0.828	0.365	0.305	0.437	0.347	0.220	0.000	0.000
0.855	0.633	0.060								
Hospital Region ID_South	-0.609	-0.764	-0.455	0.544	0.466	0.634	0.226	0.176	0.000	0.000
0.858	0.580	0.078								
Hospital Region ID_Southeast	-0.562	-0.624	-0.500	0.570	0.536	0.606	0.249	0.206	0.000	0.000
0.861	0.612	0.034								
SpO2 less 95\%	0.525	0.460	0.591	1.691	1.584	1.805	0.133	0.286	0.000	0.000
1.175	1.755	0.107								
Age 0-30	-0.481	-0.631	-0.331	0.618	0.532	0.718	0.230	0.128	0.000	0.000
0.903	0.690	0.086								
Public Hospital	0.479	0.420	0.538	1.614	1.522	1.713	0.204	0.257	0.000	0.000
1.164	1.684	0.092								
Age 30-50	-0.449	-0.531	-0.368	0.638	0.588	0.692	0.253	0.144	0.000	0.000
0.903	0.703	0.050								
Cough	-0.380	-0.449	-0.312	0.684	0.638	0.732	0.272	0.210	0.000	0.000
0.903	0.733	0.046								
Respiratory Discomfort	0.331	0.267	0.396	1.393	1.305	1.486	0.160	0.265	0.000	0.000
1.119	1.426	0.088								
Dyspnea	0.309	0.236	0.381	1.362	1.266	1.464	0.142	0.254	0.000	0.000
1.122	1.463	0.096								
Xray Torax Result Consolidation	0.275	0.127	0.423	1.316	1.135	1.526	0.221	0.326	0.000	0.000
1.094	1.315	0.181								
Schooling Superior	-0.241	-0.372	-0.109	0.786	0.689	0.896	0.227	0.173	0.000	0.000
0.933	0.819	0.097								
Vomiting	-0.227	-0.345	-0.110	0.797	0.708	0.896	0.228	0.168	0.000	0.000
0.939	0.815	0.089								
Renal Chronic Disease	0.216	0.095	0.336	1.241	1.100	1.400	0.218	0.355	0.000	0.000
1.083	1.264	0.141								
Other Symptoms	-0.213	-0.276	-0.150	0.808	0.759	0.860	0.236	0.195	0.000	0.000
0.946	0.848	0.049								
Diarrhea	-0.209	-0.299	-0.119	0.811	0.741	0.888	0.231	0.176	0.000	0.000
0.942	0.822	0.070								
Throat	-0.190	-0.265	-0.114	0.827	0.767	0.892	0.236	0.178	0.000	0.000
0.947	0.832	0.060								
Diabetes	0.189	0.125	0.252	1.208	1.133	1.287	0.198	0.299	0.000	0.000
1.070	1.246	0.075								
Fever	-0.185	-0.251	-0.118	0.831	0.778	0.888	0.253	0.214	0.000	0.000
0.960	0.887	0.053								
Antiviral Use	0.164	0.106	0.222	1.178	1.112	1.249	0.199	0.266	0.000	0.000
1.061	1.186	0.066								
Schooling Medium 1-3	-0.146	-0.245	-0.048	0.864	0.783	0.953	0.229	0.179	0.000	0.004
0.971	0.889	0.081								
Gender_F	-0.145	-0.202	-0.088	0.865	0.817	0.916	0.234	0.210	0.000	0.000
0.971	0.906	0.048								
Immunosuppression	0.143	-0.007	0.293	1.153	0.993	1.340	0.222	0.280	0.000	0.063
1.047	1.158	0.160								
Other Risks	0.136	0.074	0.198	1.145	1.077	1.218	0.203	0.283	0.000	0.000
1.055	1.175	0.068								
Race White	-0.128	-0.195	-0.061	0.879	0.822	0.940	0.232	0.204	0.000	0.000
0.966	0.885	0.057								
Another Chronic Pneumopathy	0.105	-0.024	0.235	1.111	0.976	1.264	0.220	0.326	0.000	0.110
1.038	1.104	0.135								
Liver Chronic Disease	0.092	-0.171	0.356	1.097	0.843	1.427	0.223	0.307	0.007	0.492
1.031	1.111	0.254								
Contracted At Hospital	0.085	-0.074	0.244	1.089	0.928	1.277	0.221	0.314	0.000	0.296
1.044	1.121	0.161								
Acute Respiratory Distress Syndrome	0.077	0.014	0.139	1.080	1.014	1.149	0.212	0.259	0.000	0.016
1.028	1.107	0.066								
Neurological Disease	-0.069	-0.199	0.062	0.933	0.819	1.063	0.222	0.274	0.000	0.301
0.968	0.930	0.114								
Age 65-100	0.068	0.001	0.136	1.071	1.001	1.145	0.183	0.281	0.000	0.047
1.034	1.143	0.070								
Cardiovascular Disease	0.032	-0.030	0.094	1.033	0.971	1.099	0.195	0.281	0.000	0.307
1.023	1.063	0.062								

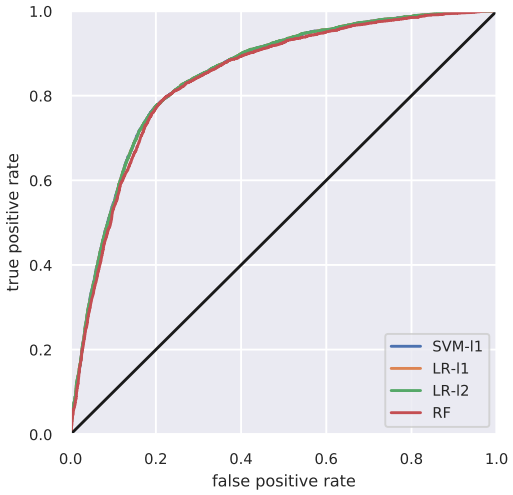

Cardiovascular Disease
Age 65-100
Neurological Disease
Acute Respiratory Distress Syndrome
Contracted At Hospital
Liver Chronic Disease
Another Chronic Pneumopathy
Race White
Other Risks
Immunosuppression
Gender_F
Schooling Medium 1-3
Antiviral Use
Fever
Diabetes
Throat
Diarrhea
Other Symptoms
Renal Chronic Disease
Vomiting
Schooling Superior
Xray Torax Result Consolidation
Dyspnea
Respiratory Discomfort
Cough
Age 30-50
Public Hospital
Age 0-30
SpO2 less 95\%
Hospital Region ID_Southeast
Hospital Region ID_South
BMI 25-30
BMI 40-100
BMI 30-40
ICU
0
2
4
6
8
10
12
14
16

Recursive Feature Elimination:



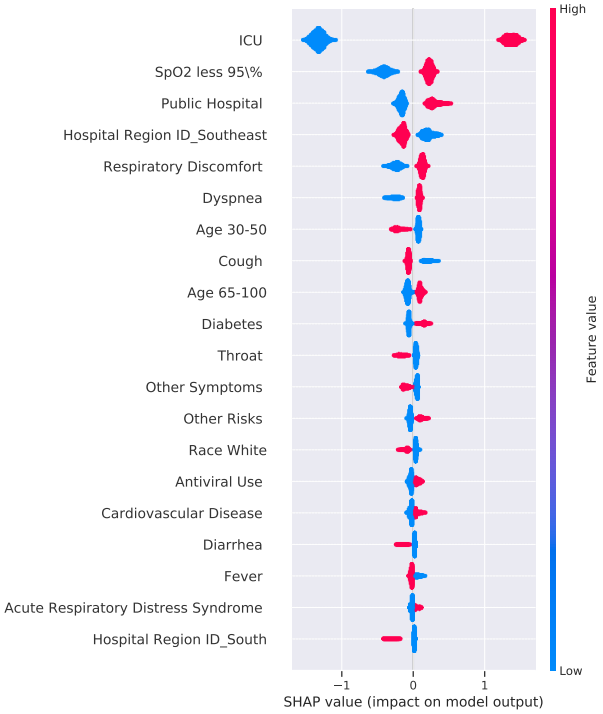
Performance:

	SVM-l1	LR-l1	LR-l2	RF	XGBoost
Accuracy	0.812	0.811	0.811	0.753	0.815
F1w	0.807	0.806	0.806	0.647	0.810
AUC	0.848	0.849	0.849	0.842	0.851



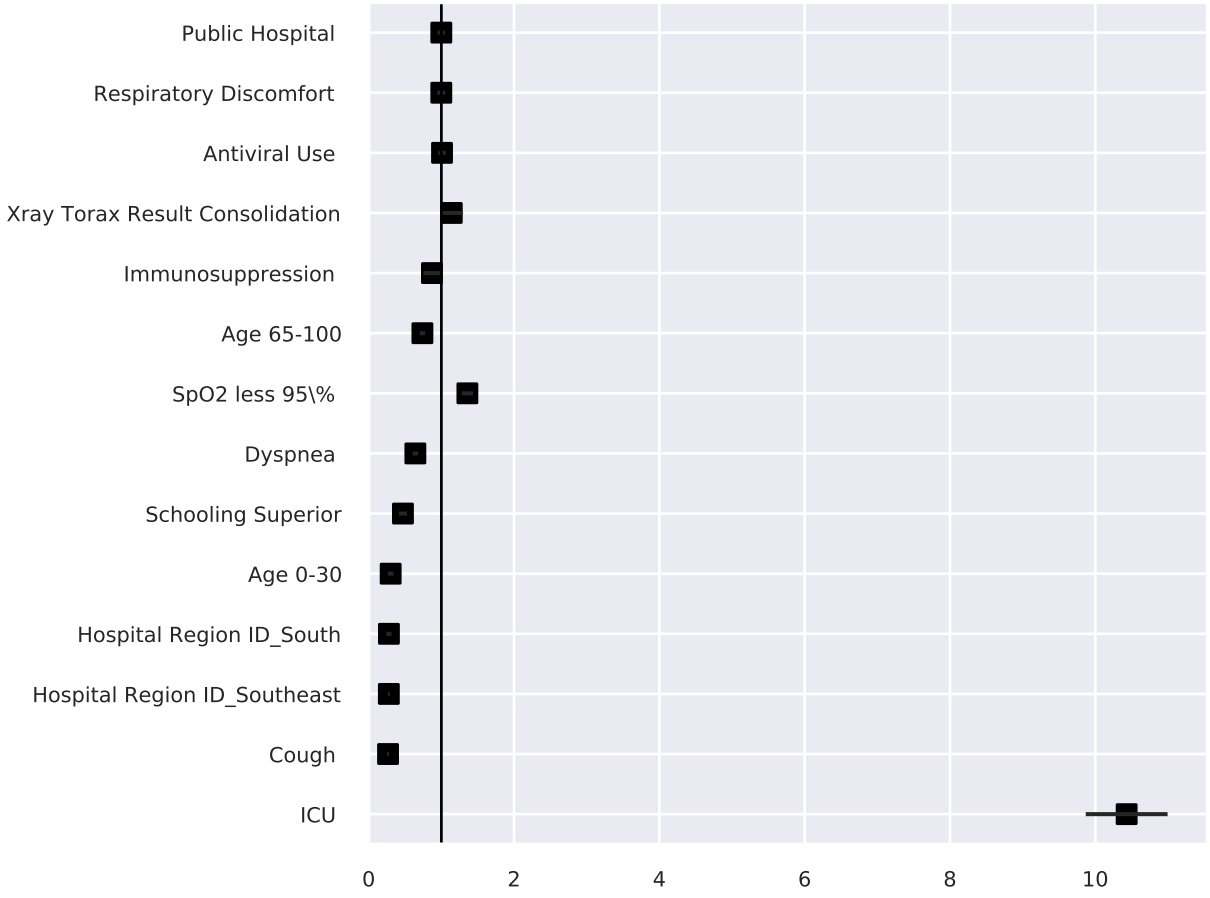
Coefficients:

	SVM-l1	LR-l1
Hospital Region ID_South	0.858	0.580
Hospital Region ID_Southeast	0.861	0.612
BMI 25-30	0.855	0.633
Age 0-30	0.903	0.690
Age 30-50	0.903	0.703
Cough	0.903	0.733
Vomiting	0.939	0.815
Schooling Superior	0.933	0.819
Diarrhea	0.942	0.822
Throat	0.947	0.832
Other Symptoms	0.946	0.848
Race White	0.966	0.885
Fever	0.960	0.887
Schooling Medium 1-3	0.971	0.889
Gender_F	0.971	0.906
Neurological Disease	0.968	0.930
Cardiovascular Disease	1.023	1.063
Another Chronic Pneumopathy	1.038	1.104
Acute Respiratory Distress Syndrome	1.028	1.107
Liver Chronic Disease	1.031	1.111
Contracted At Hospital	1.044	1.121
Age 65-100	1.034	1.143
BMI 40-100	1.057	1.156
Immunosuppression	1.047	1.158
Other Risks	1.055	1.175
Antiviral Use	1.061	1.186
BMI 30-40	1.089	1.235
Diabetes	1.070	1.246
Renal Chronic Disease	1.083	1.264
Xray Torax Result Consolidation	1.094	1.315
Respiratory Discomfort	1.119	1.426
Dyspnea	1.122	1.463
Public Hospital	1.164	1.684
SpO2 less 95\%	1.175	1.755
ICU	2.480	15.786

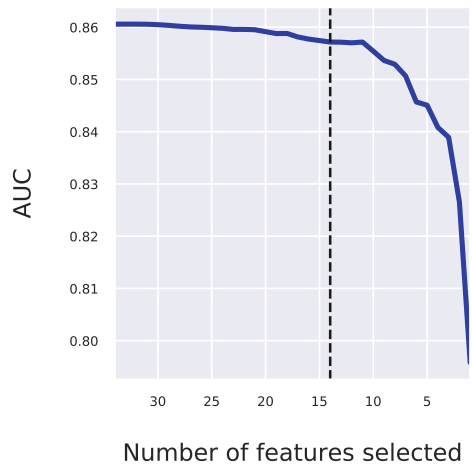

ICU
SpO2 less 95\%
Public Hospital
Hospital Region ID_Southeast
Respiratory Discomfort
Dyspnea
Age 30-50
Cough
Age 65-100
Diabetes
Throat
Other Symptoms
Other Risks
Race White
Antiviral Use
Cardiovascular Disease
Diarrhea
Fever
Acute Respiratory Distress Syndrome
Hospital Region ID_South
−1
0
1
SHAP value (impact on model output)
High
Feature value
Low

2.10 Ventilator with ICU small

SVM-l1	Coef LR-l1	2.5 err	97.5	Odds Ratio	2.5	97.5	Avg-0	Avg-1	KS-pv	pvalue
ICU	2.345	2.289	2.400	10.431	9.868	11.027	0.068	0.525	0.000	0.000
2.518	16.623	0.563								
Cough	-1.324	-1.378	-1.271	0.266	0.252	0.281	0.278	0.209	0.000	0.000
0.875	0.657	0.014								
Hospital Region ID_Southeast	-1.282	-1.333	-1.232	0.277	0.264	0.292	0.250	0.207	0.000	0.000
0.857	0.591	0.013								
Hospital Region ID_South	-1.279	-1.416	-1.143	0.278	0.243	0.319	0.226	0.180	0.001	0.000
0.850	0.538	0.035								
Age 0-30	-1.198	-1.336	-1.060	0.302	0.263	0.346	0.230	0.125	0.000	0.000
0.906	0.705	0.039								
Schooling Superior	-0.753	-0.876	-0.630	0.471	0.416	0.533	0.227	0.173	0.000	0.000
0.902	0.743	0.055								
Dyspnea	-0.443	-0.503	-0.383	0.642	0.605	0.682	0.147	0.252	0.000	0.000
1.103	1.408	0.037								
SpO2 less 95\%	0.306	0.247	0.365	1.358	1.280	1.440	0.134	0.285	0.000	0.000
1.174	1.780	0.078								
Age 65-100	-0.303	-0.353	-0.252	0.739	0.703	0.777	0.184	0.280	0.000	0.000
1.096	1.400	0.036								
Immunosuppression	-0.139	-0.284	0.006	0.870	0.753	1.006	0.223	0.274	0.002	0.060
1.047	1.152	0.117								
Xray Torax Result Consolidation	0.134	-0.010	0.278	1.143	0.990	1.320	0.221	0.325	0.000	0.069
1.091	1.290	0.153								
Antiviral Use	0.009	-0.045	0.063	1.009	0.956	1.065	0.202	0.264	0.000	0.745
1.053	1.163	0.053								
Respiratory Discomfort	-0.001	-0.059	0.056	0.999	0.943	1.058	0.159	0.266	0.000	0.965
1.123	1.446	0.056								
Public Hospital	-0.001	-0.054	0.051	0.999	0.948	1.053	0.205	0.257	0.000	0.961
1.173	1.753	0.051								

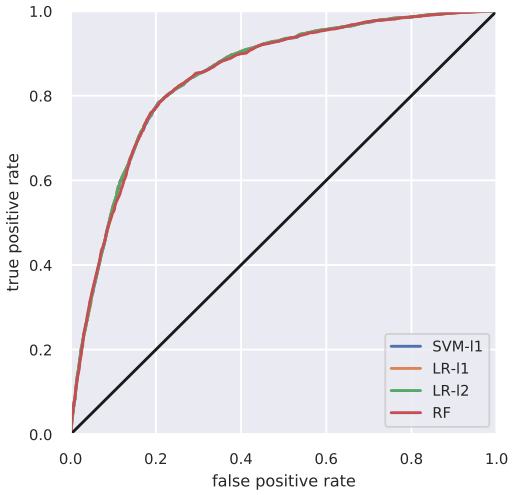
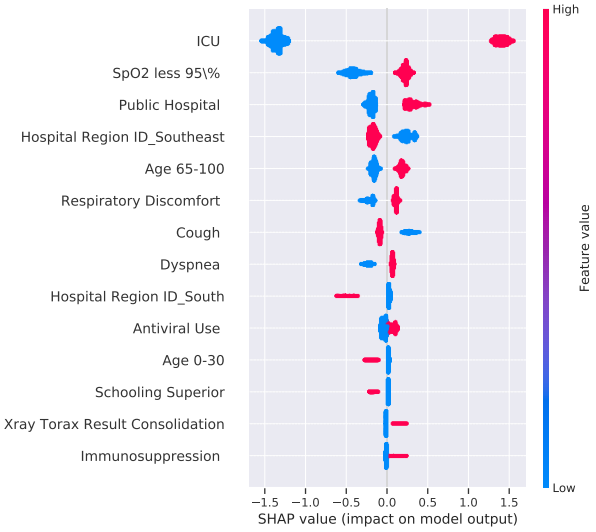

Public Hospital
Respiratory Discomfort
Antiviral Use
Xray Torax Result Consolidation
Immunosuppression
Age 65-100
SpO2 less 95\%
Dyspnea
Schooling Superior
Age 0-30
Hospital Region ID_South
Hospital Region ID_Southeast
Cough
ICU
0
2
4
6
8
10

Recursive Feature Elimination:



Coefficients:

	SVM-l1	LR-l1
Hospital Region ID_South	0.850	0.538
Hospital Region ID_Southeast	0.857	0.591
Cough	0.875	0.657
Age 0-30	0.906	0.705
Schooling Superior	0.902	0.743
Immunosuppression	1.047	1.152
Antiviral Use	1.053	1.163
Xray Torax Result Consolidation	1.091	1.290
Age 65-100	1.096	1.400
Dyspnea	1.103	1.408
Respiratory Discomfort	1.123	1.446
Public Hospital	1.173	1.753
SpO2 less 95\%	1.174	1.780
ICU	2.518	16.623

Performance:

	SVM-l1	LR-l1	LR-l2	RF	XGBoos
Accuracy	0.812	0.813	0.813	0.789	0.81
F1w	0.809	0.807	0.807	0.744	0.81
AUC	0.848	0.848	0.848	0.847	0.85