

Logistic regression

Number of obs = 4,489

LR chi2(97) = 2799.66

Prob > chi2 = 0.0000

Log likelihood = -1676.3101

Pseudo R2 = 0.4551

target_class	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]
abd	1.312707	.1505105	2.37	0.018	1.048508 1.643477
access	.7547866	.1988913	-1.07	0.286	.4503259 1.26509
acidosis	.8821429	.1571166	-0.70	0.481	.6222047 1.250675
advice	1.048688	.1242886	0.40	0.688	.8313111 1.322907
airway	1.484385	.4121453	1.42	0.155	.8614048 2.557914
aki	1.37394	.1500952	2.91	0.004	1.10912 1.701988
aml	1.18064	.3605019	0.54	0.587	.6489451 2.147965
anc	.9483459	.1930252	-0.26	0.794	.6363766 1.413251
atn	.8241857	.1652044	-0.96	0.335	.5564235 1.2208
baseline	1.094527	.1549736	0.64	0.524	.8292879 1.444601
blood	1.416887	.1475755	3.35	0.001	1.155257 1.737768
bma	.6842508	.1602016	-1.62	0.105	.4324402 1.082691
bp	1.118125	.1553794	0.80	0.422	.8515376 1.468172
cardiogenic	3.607106	.975206	4.75	0.000	2.123394 6.127553
cast	.6401722	.1442472	-1.98	0.048	.4116226 .9956217
cc	2.204158	.3449583	5.05	0.000	1.62191 2.995427
central	.7821164	.1447861	-1.33	0.184	.5441219 1.124208
ceftazidime	.7822939	.133816	-1.44	0.151	.5594572 1.093888
chemo	.5000493	.1016812	-3.41	0.001	.3356816 .7449003
cirrhosis	1.084151	.1740258	0.50	0.615	.7915101 1.484988
cloxacillin	.2552887	.0646073	-5.40	0.000	.1554581 .4192275
consult	.7938307	.0834345	-2.20	0.028	.6460461 .9754213
creatinine	1.138884	.2962344	0.50	0.617	.684028 1.896204
cpr	1.198563	.1390785	1.56	0.119	.9547495 1.504639
crprt	1.537473	.0492976	2.65	0.008	1.118889 2.112651
cvp	.6101529	.0862879	-3.49	0.000	.4624467 .8050367
drip	1.16762	.1329795	1.36	0.174	.9340257 1.459635
drop	1.067062	.1141721	0.61	0.544	.8651947 1.316029
echo	1.476275	.1735911	3.31	0.001	1.172403 1.858907
edema	.9347831	.1127919	-0.56	0.576	.737911 1.18418
empirical	.9502923	.1126123	-0.43	0.667	.7533338 1.198745
er	1.304731	.1385295	2.51	0.012	1.059607 1.606561
ext	1.103576	.1493174	0.73	0.466	.8465094 1.438707
febrile	.6179063	.1882173	-1.58	0.114	.340128 1.122543
fine	.7246131	.1299983	-1.80	0.073	.5097972 1.029947
ft3	4.599089	2.845301	2.47	0.014	1.367925 15.46256
ft4	.5819468	.3436943	-0.92	0.359	.182881 1.851816
gs	1.451867	.2542598	2.13	0.033	1.030052 2.046418
gross	1.306317	.271141	1.29	0.198	.8697049 1.962118
hd	.7107234	.1234406	-1.97	0.049	.5056632 .9989411
hco3	1.307457	.1727942	2.03	0.043	1.009095 1.694036
heart	1.30711	.1858819	1.88	0.060	.9891548 1.727269
heent	1.839868	.3386552	3.31	0.001	1.282657 2.639144
hemodynamic	1.014569	.2063055	0.07	0.943	.6810758 1.511358
hydrocortisone	2.049864	.3256971	4.52	0.000	1.501343 2.798788
hypovolemic	1.410669	.2966469	1.64	0.102	.9341739 2.130212
iii	.7427515	.1008864	-2.19	0.029	.5691498 .9693052
imp	1.023761	.0984799	0.24	0.807	.8478482 1.236173
iv	.8112706	.0958949	-1.77	0.077	.6435034 1.022776
jx	.8692262	.1094133	-1.11	0.266	.6791853 1.112442
lavage	1.217908	.2427157	0.99	0.323	.8240991 1.799905
lab	1.610567	.1759364	4.36	0.000	1.300154 1.995093
levophed	1.796637	.1926618	5.46	0.000	1.456069 2.216862
line	1.102703	.1966403	0.55	0.584	.7774409 1.564047
load	.9900765	.1273561	-0.08	0.938	.7694431 1.273975
lpm	1.145388	.1728549	0.90	0.368	.8521075 1.53961
lt	1.133515	.1584021	0.90	0.370	.8619395 1.490657
lungs	.8190732	.0928134	-1.76	0.078	.6559469 1.022767
male	1.257912	.1330791	2.17	0.030	1.022348 1.547754
meropenem	.8431966	.0850534	-1.69	0.091	.6919392 1.027519
med	1.348734	.141828	2.84	0.004	1.097532 1.657432
metabolic	.8742351	.1593412	-0.74	0.461	.611625 1.249601
ml	1.186702	.1336446	1.52	0.129	.9516569 1.479799
muddy	1.014457	.2964143	0.05	0.961	.5721642 1.798648
murmur	1.231354	.1778351	1.44	0.150	.9277919 1.634239
na	1.36711	.165493	2.58	0.010	1.078357 1.733181
nephro	.9546048	.1329944	-0.33	0.739	.7264993 1.254331
neutropenia	.720416	.2310686	-1.02	0.307	.3842078 1.350829
pale	1.182275	.1990276	0.99	0.320	.8500111 1.644418
nss	1.556403	.1988718	3.46	0.001	1.211598 1.999336
pale	1	(omitted)			
pi	1.96386	.3263698	4.06	0.000	1.417918 2.720007
pr	1.089518	.1293686	0.72	0.470	.8633034 1.375009
regular	.7818788	.1081319	-1.78	0.075	.5962389 1.025318
rr	1.104645	.1400996	0.78	0.433	.8615231 1.416377
rt	1.324156	.1238344	3.00	0.003	1.102389 1.590534
sis2	1.258019	.1858213	1.55	0.120	.9417959 1.68042
sec	1.294926	.197814	1.69	0.091	.9598748 1.746929
secretion	1.294984	.226893	1.48	0.140	.9185991 1.825588
segment	.9457513	.1840562	-0.29	0.774	.6458349 1.384945
septic	4.223074	.4677134	13.01	0.000	3.399042 5.246877
serum	1.172935	.1535837	1.22	0.223	.9074399 1.516107
set	.9133696	.093427	-0.89	0.376	.7474438 1.116129
soft	.8879343	.1138877	-0.93	0.354	.6905649 1.141713
sound	.8776078	.1075901	-1.06	0.287	.6901565 1.115972
sputum	.9662929	.10546	-0.31	0.753	.7802068 1.196762
stable	1.090763	.1126609	0.84	0.400	.8908676 1.335513
start	.7945118	.0817587	-2.24	0.025	.6493937 .9720592
sub	1.382406	.2905019	1.54	0.123	.9157187 2.086935
subicu	.629232	.1238056	-2.35	0.019	.4278892 .9253166
tft	.7562569	.2149328	-0.98	0.326	.4332641 1.320037
tracheostomy	.8014129	.1509487	-1.18	0.240	.5540255 1.159265
ud	1.141723	.1059729	1.43	0.153	.9518172 1.369518
ua	.7453959	.0786757	-2.78	0.005	.6060991 .9167067
ugih	.6107165	.0972464	-3.10	0.002	.4469923 .8344095
ward	1.027241	.1146801	0.24	0.810	.8253631 1.278496
wbc	.156478	.1658742	-1.75	0.080	.0195947 1.24959
yr	1.252139	.1224634	2.30	0.022	1.033718 1.516711
_cons	.0369426	.0056253	-21.66	0.000	.0274103 .0497899

. lroc

Logistic model for target_class

number of observations = 4489

area under ROC curve = 0.9084

การวิเคราะห์ Logistic regression analysis โดยใช้ Predictive model ในการทำนายความสามารถของลักษณะหรือ Feature ทั้งหมด 96 ตัวแปร

Area under ROC curve = 0.9084

ทำการวิเคราะห์ Stepwise backward elimination ตัดตัวแปรที่ไม่มีนัยสำคัญทางสถิติออกจาก model จาก 96 ตัวแปรเหลือ 35 ตัวแปร

Area under ROC curve = 0.9009

Logistic regression

> Number of obs = 4,489

> LR chi2(36) = 2686.83

> Prob > chi2 = 0.0000

Log likelihood = -1732.7263

> Pseudo R2 = 0.4367

target_class	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]
abd	1.339735	.139006	2.82	0.005	1.093204 1.641861
aki	1.334342	.1330311	2.89	0.004	1.097499 1.622296
blood	1.460383	.1440943	3.84	0.000	1.203593 1.77196
cardiogenic	3.975265	1.048428	5.23	0.000	2.370675 6.665921
cast	.6073101	.105674	-2.87	0.004	.4318158 .8541269
cc	2.170201	.3287269	5.12	0.000	1.612746 2.920344
chemo	.3702921	.0682798	-5.39	0.000	.257981 .5314975
cloxacillin	.2653194	.0627266	-5.61	0.000	.1669278 .4217056
consult	.8090175	.078961	-2.17	0.030	.6681589 .9795714
crprt	1.438689	.2090286	2.50	0.012	1.082168 1.912664
cvp	.6221254	.0792112	-3.73	0.000	.48473 .7984651
echo	1.56741	.1777744	3.96	0.000	1.254989 1.957606
er	1.472082	.1425739	3.99	0.000	1.217564 1.779805
fine	.7223042	.1259044	-1.87	0.062	.5132722 1.016465
ft3	2.16753	.5055153	3.32	0.001	1.372291 3.423607
gs	1.450847	.2458908	2.20	0.028	1.040781 2.022479
hd	.7793285	.1254826	-1.55	0.122	.5684149 1.068503
hco3	1.360341	.1601803	2.61	0.009	1.079987 1.713471
heent	2.330801	.2534833	7.78	0.000	1.883362 2.88454
hydrocortisone	2.000367	.2948556	4.70	0.000	1.498449 2.670407
iii	.7844779	.101547	-1.88	0.061	.6086906 1.011032
lab	1.587964	.165098	4.45	0.000	1.295217 1.946877
levophed	1.793135	.1786847	5.86	0.000	1.474998 2.179891
male	1.289573	.1311148	2.50	0.012	1.056578 1.573947
meropenem	.8287471	.0792386	-1.96	0.049	.6871262 .9995569
med	1.498736	.1503851	4.03	0.000	1.23116 1.824466
na	1.406701	.1623262	2.96	0.003	1.121961 1.763706
nss	1.718592	.1780267	5.23	0.000	1.402807 2.105463
pi	2.121777	.3388769	4.71	0.000	1.551498 2.901672
rt	1.33978	.1199439	3.27	0.001	1.124164 1.596752
septic	4.250366	.4474033	13.75	0.000	3.458015 5.224272
start	.7675102	.0752447	-2.70	0.007	.6333367 .9301087
subicu	.7041278	.1308891	-1.89	0.059	.4891287 1.013631
ua	.7652608	.0768387	-2.66	0.008	.6285526 .9317026
ugih	.6959277	.0985846	-2.56	0.010	.5272098 .9186388
yr	1.210261	.1141869	2.02	0.043	1.005933 1.456092
_cons	.0368298	.0046321	-26.25	0.000	.0287834 .0471255

. lroc

Logistic model for target_class

number of observations = 4489

area under ROC curve = 0.9009

ทำการวิเคราะห์ Stepwise backward elimination ตัดตัวแปรที่ไม่มีนัยสำคัญทางสถิติออกจาก model จาก 36 ตัวแปรเหลือ 31 ตัวแปร

Logistic model for target_class, goodness-of-fit test

target_class	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	
abd	1.335559	.1382175	2.80	0.005	1.090365	1.635891
aki	1.320508	.1311929	2.80	0.005	1.086861	1.604383
blood	1.427467	.1401399	3.63	0.000	1.177607	1.730342
cardiogenic	0.497584	0.1097007	5.36	0.000	0.2445586	0.8655509
cast	.5794181	.0989853	-3.17	0.002	.4133346	.8122363
cc	2.210368	.3329002	5.27	0.000	1.645381	2.969359
chemo	.3766194	.069397	-5.30	0.000	.2624569	.54044
Cloxacillin	.273075	.0647389	-5.47	0.000	.1715617	.4345664
consult	.779793	.0776506	-2.30	0.021	.6612045	.9674297
crrt	1.409756	.2034197	2.38	0.017	1.062479	1.870542
cvp	.6175029	.0779024	-3.82	0.000	.4822295	.7907226
echo	1.464654	.1631452	3.43	0.001	1.177393	1.822002
er	1.457779	.1407867	3.90	0.000	1.206385	1.76156
ft3	2.054576	.4795346	3.09	0.002	1.300329	3.246319
gs	1.354247	.2266719	1.81	0.070	.9753541	1.880328
hco3	1.330671	.1558155	2.44	0.015	1.057788	1.67395
heent	2.275548	.2466024	7.61	0.000	1.84102	2.812635
hydrocortisone	1.969564	.2887408	4.62	0.000	1.477688	2.625169
lab	1.581731	.1640616	4.42	0.000	1.290754	1.938303
levophed	1.769917	.1753616	5.76	0.000	1.457528	2.149261
male	1.294857	.131058	2.55	0.011	1.061862	1.578976
meropenem	.8020001	.0762409	-2.32	0.020	.6656659	.9662567
med	1.471883	.1453958	3.91	0.000	1.212802	1.78631
na	1.427973	.1640298	3.10	0.002	1.140101	1.788532
nss	1.722847	.1769164	3.10	0.002	1.408764	2.106955
pi	2.115419	.3361334	4.72	0.000	1.549327	2.888349
prt	1.31618	.1172842	3.08	0.002	1.105262	1.567348
septic	4.235553	.4440825	13.77	0.000	3.448774	5.201823
start	.7618018	.0744303	-2.78	0.005	.6293083	.9225862
ua	.6729034	.076284	-2.71	0.007	.6271284	.9280741
ugih	.6735572	.0947626	-2.81	0.005	.5112333	.8874212
yr	1.195683	.112408	1.90	0.057	.994471	1.437603
_cons	.0369886	.0046275	-26.35	0.000	.0289453	.0472671

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. 1roc
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Logistic model for target_class

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number of observations = 4489
area under ROC curve = 0.9003
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Area under ROC curve = 0.9003

ทำการวิเคราะห์ Stepwise backward elimination ตัดตัวแปรที่ไม่มีนัยสำคัญทางสถิติออกจาก model จาก 31 ตัวแปรเหลือ 29 ตัวแปร

Area under ROC curve = 0.9003

Logistic regression	Number of obs	=	4,489
	LR chi2(30)	=	2666.19
	Prob > chi2	=	0.0000
Log likelihood = -1743.0438	Pseudo R2	=	0.4334

target_class	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	
abd	1.360987	.1401168	2.99	0.003	1.112297	1.66528
aki	1.320853	.1309455	2.81	0.005	1.087599	1.604132
blood	1.428046	.1400302	3.63	0.000	1.178354	1.730647
cardiogenic	4.106846	1.081365	5.36	0.000	2.450978	6.881412
cast	.5888026	.1012563	-3.08	0.002	.4203284	.8248038
cc	2.198759	.3304892	5.24	0.000	1.637706	2.95202
chemo	.3754587	.069329	-5.31	0.000	.2614487	.539185
cloxacillin	.2685774	.0635991	-5.55	0.000	.1688515	.4272026
consult	.8019868	.0778141	-2.27	0.023	.6630984	.969659
crprt	1.410462	.2028257	2.39	0.017	1.064039	1.86967
cvp	.6250457	.075893	-3.74	0.000	.4885197	.7997265
echo	1.473807	.163818	3.49	0.000	1.185297	1.832543
er	1.44273	.138993	3.80	0.000	1.194483	1.742569
ft3	2.038662	.4764173	3.05	0.002	1.289517	3.232024
hco3	1.336717	.1561849	2.48	0.013	1.063122	1.680721
heent	2.252141	.243146	7.52	0.000	1.822628	2.782872
hydrocortisone	2.011499	.2943176	4.78	0.000	1.510255	2.671903
lab	1.59906	.165301	4.54	0.000	1.305789	1.958199
levophed	1.771029	.17529	5.77	0.000	1.458737	2.150179
male	1.375471	.1338815	3.28	0.001	1.136579	1.664575
meropenem	.8146241	.0771075	-2.17	0.030	.6766866	.9806791
med	1.495065	.1472164	4.08	0.000	1.232662	1.813329
na	1.428399	.1637291	3.11	0.002	1.140988	1.788207
nss	1.722644	.1766692	5.30	0.000	1.408961	2.106164
pi	2.188631	.3460536	4.95	0.000	1.605408	2.983731
rt	1.33663	.1187812	3.27	0.001	1.12297	1.590942
septic	4.264415	.4464903	13.85	0.000	3.473261	5.235781
start	.766639	.0747822	-2.72	0.006	.6332278	.9281578
ua	.7763213	.0773404	-2.54	0.011	.638618	.943717
ugh	.6770012	.094954	-2.78	0.005	.5142835	.8912022
_cons	.0376405	.0046243	-26.70	0.000	.0295858	.0478882

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. 1roc
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Logistic model for target_class

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number of observations = 4489
area under ROC curve = 0.9001
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      number of observations =      4489
number of covariate patterns =      3569
      Pearson chi2(3538) =      3495.52
          Prob > chi2 =           0.6911

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ทดสอบ Goodness-of-fit พบว่าตัวแปรที่
ได้จากการวิเคราะห์สมการในเบื้องต้น
ทั้งหมด 29 ตัวแปรสามารถใช้ทำนายการ
แยกระหว่างกลุ่ม Sepsis non-shock และ
กลุ่ม Sepsis with shock ได้

