

# Surveillance Dataset Logistic Regression Analysis

```
#Prepare Environment and Load Libraries
rm(list=ls())
library("ROCR")
```

```
## Warning: package 'ROCR' was built under R version 4.0.4
```

```
#Load Data
ds <- data.table::fread(file = 'surveillance_dataset.csv', header = T, sep = ',', stringsAsFactors = T)
#Exclude Index Column
ds <- ds[,-1]
str(ds)
```

```
## Classes 'data.table' and 'data.frame': 6305389 obs. of 4 variables:
## $ sex : Factor w/ 2 levels "Female","Male": 2 1 1 2 2 1 2 2 2 2 ...
## $ age_group : Factor w/ 9 levels "0 - 9 Years",...: 1 1 1 1 1 1 1 1 1 1 ...
## $ race_ethnicity_combined: Factor w/ 7 levels "American Indian/Alaska Native, Non-Hispanic",...: 7 7 7 7 7 7 4 4 4 4 ...
## $ death_yn : Factor w/ 2 levels "No","Yes": 1 1 1 1 1 1 1 1 1 1 ...
## - attr(*, ".internal.selfref")=<externalptr>
```

```
#Define Training Set (80%) and Test Set (20%) by Random Sampling
set.seed(0)
sample_train <- sample(nrow(ds), size = nrow(ds) * 0.75)
training_set <- ds[sample_train,]
test_set <- ds[-sample_train,]
```

```
#Apply Logistic Regression with Death Status as Response
ds_logit <- glm(death_yn~., family = 'binomial', data = training_set)
summary(ds_logit)
```

```
##
## Call:
## glm(formula = death_yn ~ ., family = "binomial", data = training_set)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -1.3592  -0.2075  -0.0906  -0.0372   4.2020
##
## Coefficients:
##                                     Estimate
## (Intercept)                        -7.735830
## sexMale                             0.502905
## age_group10 - 19 Years              -0.143772
## age_group20 - 29 Years               1.049049
## age_group30 - 39 Years               2.101511
## age_group40 - 49 Years               3.100053
## age_group50 - 59 Years               4.127359
## age_group60 - 69 Years               5.307174
## age_group70 - 79 Years               6.422032
## age_group80+ Years                  7.650765
## race_ethnicity_combinedAsian, Non-Hispanic -0.362889
## race_ethnicity_combinedBlack, Non-Hispanic -0.070610
## race_ethnicity_combinedHispanic/Latino    -0.044283
## race_ethnicity_combinedMultiple/Other, Non-Hispanic -0.948650
## race_ethnicity_combinedNative Hawaiian/Other Pacific Islander, Non-Hispanic -0.488442
## race_ethnicity_combinedWhite, Non-Hispanic -0.721775
##                                     Std. Error
## (Intercept)                        0.116026
## sexMale                             0.005063
## age_group10 - 19 Years              0.138985
## age_group20 - 29 Years               0.118404
## age_group30 - 39 Years               0.115264
## age_group40 - 49 Years               0.114069
## age_group50 - 59 Years               0.113560
## age_group60 - 69 Years               0.113396
## age_group70 - 79 Years               0.113362
## age_group80+ Years                  0.113351
## race_ethnicity_combinedAsian, Non-Hispanic 0.028247
## race_ethnicity_combinedBlack, Non-Hispanic 0.026277
## race_ethnicity_combinedHispanic/Latino     0.026452
## race_ethnicity_combinedMultiple/Other, Non-Hispanic 0.027712
## race_ethnicity_combinedNative Hawaiian/Other Pacific Islander, Non-Hispanic 0.055671
## race_ethnicity_combinedWhite, Non-Hispanic 0.025647
##                                     z value
## (Intercept)                        -66.673
## sexMale                             99.329
## age_group10 - 19 Years              -1.034
## age_group20 - 29 Years               8.860
## age_group30 - 39 Years              18.232
## age_group40 - 49 Years              27.177
## age_group50 - 59 Years              36.345
## age_group60 - 69 Years              46.802
## age_group70 - 79 Years              56.651
```

```

## age_group80+ Years 67.496
## race_ethnicity_combinedAsian, Non-Hispanic -12.847
## race_ethnicity_combinedBlack, Non-Hispanic -2.687
## race_ethnicity_combinedHispanic/Latino -1.674
## race_ethnicity_combinedMultiple/Other, Non-Hispanic -34.232
## race_ethnicity_combinedNative Hawaiian/Other Pacific Islander, Non-Hispanic -8.774
## race_ethnicity_combinedWhite, Non-Hispanic -28.142
## Pr(>|z|)
## (Intercept) < 2e-16
## sexMale < 2e-16
## age_group10 - 19 Years 0.30093
## age_group20 - 29 Years < 2e-16
## age_group30 - 39 Years < 2e-16
## age_group40 - 49 Years < 2e-16
## age_group50 - 59 Years < 2e-16
## age_group60 - 69 Years < 2e-16
## age_group70 - 79 Years < 2e-16
## age_group80+ Years < 2e-16
## race_ethnicity_combinedAsian, Non-Hispanic < 2e-16
## race_ethnicity_combinedBlack, Non-Hispanic 0.00721
## race_ethnicity_combinedHispanic/Latino 0.09411
## race_ethnicity_combinedMultiple/Other, Non-Hispanic < 2e-16
## race_ethnicity_combinedNative Hawaiian/Other Pacific Islander, Non-Hispanic < 2e-16
## race_ethnicity_combinedWhite, Non-Hispanic < 2e-16
##
## (Intercept) ***
## sexMale ***
## age_group10 - 19 Years
## age_group20 - 29 Years ***
## age_group30 - 39 Years ***
## age_group40 - 49 Years ***
## age_group50 - 59 Years ***
## age_group60 - 69 Years ***
## age_group70 - 79 Years ***
## age_group80+ Years ***
## race_ethnicity_combinedAsian, Non-Hispanic ***
## race_ethnicity_combinedBlack, Non-Hispanic **
## race_ethnicity_combinedHispanic/Latino .
## race_ethnicity_combinedMultiple/Other, Non-Hispanic ***
## race_ethnicity_combinedNative Hawaiian/Other Pacific Islander, Non-Hispanic ***
## race_ethnicity_combinedWhite, Non-Hispanic ***
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 1741638 on 4729040 degrees of freedom
## Residual deviance: 1132755 on 4729025 degrees of freedom
## AIC: 1132787
##
## Number of Fisher Scoring iterations: 10

```

```

#Fitting Test Set @ 0.5 Cutoff
pred <- predict(ds_logit, test_set, type = "response")
rounded_pred <- ifelse(pred >= 0.5, 1, 0)
#Confusion Matrix
tab <- table(Predicted = rounded_pred, Actual = test_set$death_yn)
tab

```

```

##           Actual
## Predicted    No    Yes
##           0 1500984  68594
##           1   3313   3457

```

```

#Accuracy
(tab[1,1] + tab[2,2]) / nrow(test_set)

```

```

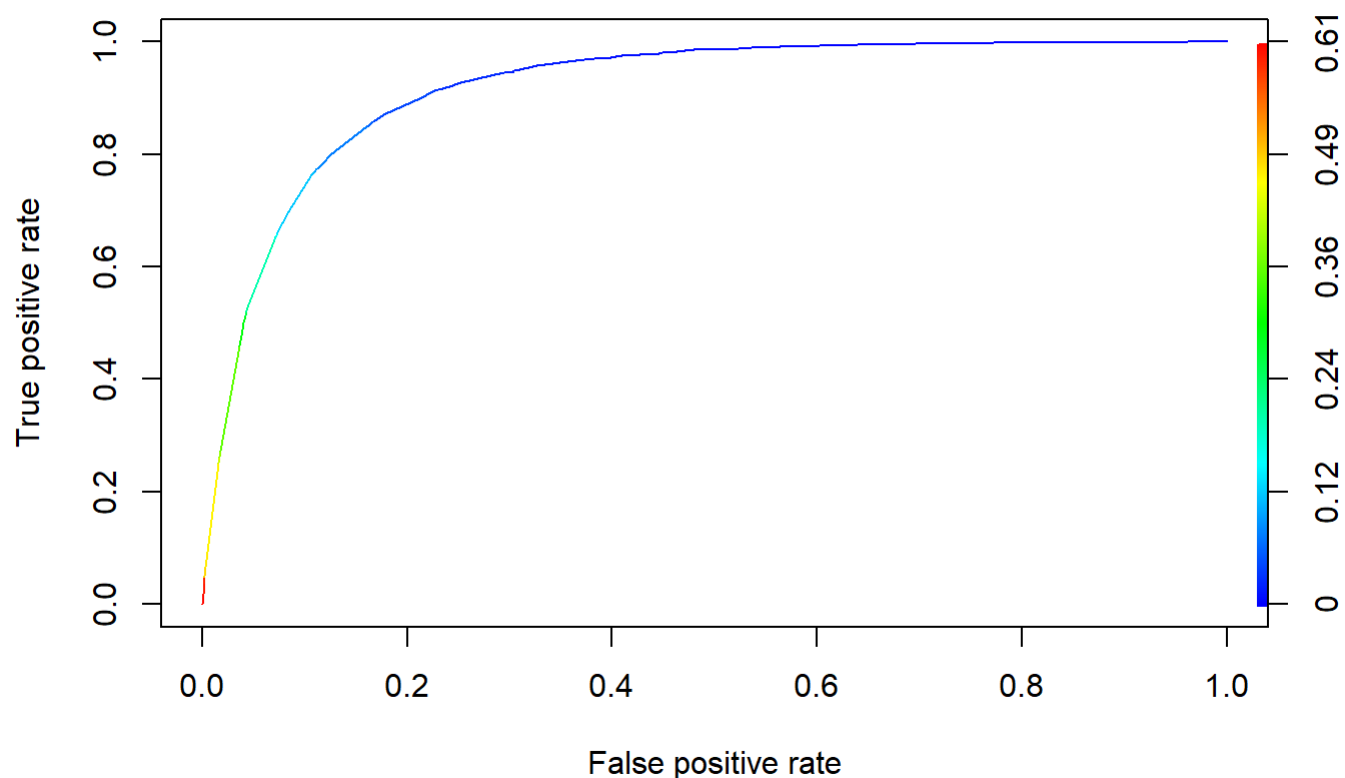
## [1] 0.9543838

```

```

#ROC Curve
pred.rocr <- prediction(pred, test_set$death_yn)
pred <- performance(pred.rocr, "tpr", "fpr")
plot(pred, colorize = T)

```



```
auc.rocr <- performance(pred.rocr, measure = "auc")
auc <- unlist(auc.rocr@y.values)
auc
```

```
## [1] 0.9173783
```

```
#Coefficient Analysis
coeff <- ds_logit$coefficients
#Factor Combination Table
grp <- expand.grid(sex = levels(ds$sex), age_group = levels(ds$age_group), race_ethnicity_combined = levels(ds$race_ethnicity_combined))
#Log Odds
grp$log_odds <- predict(ds_logit, grp)
#odds For
grp$odds <- exp(grp$log_odds)
#Probability
grp$probability <- exp(grp$log_odds) / (1 + exp(grp$log_odds))
#Sorted by Probability of Death
grp_sorted <- grp[order(-grp$probability),]
grp_sorted
```

##	sex	age_group	race_ethnicity_combined
## 18	Male	80+ Years	American Indian/Alaska Native, Non-Hispanic
## 72	Male	80+ Years	Hispanic/Latino
## 54	Male	80+ Years	Black, Non-Hispanic
## 36	Male	80+ Years	Asian, Non-Hispanic
## 108	Male	80+ Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 17	Female	80+ Years	American Indian/Alaska Native, Non-Hispanic
## 71	Female	80+ Years	Hispanic/Latino
## 53	Female	80+ Years	Black, Non-Hispanic
## 126	Male	80+ Years	White, Non-Hispanic
## 35	Female	80+ Years	Asian, Non-Hispanic
## 90	Male	80+ Years	Multiple/Other, Non-Hispanic
## 107	Female	80+ Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 125	Female	80+ Years	White, Non-Hispanic
## 16	Male	70 - 79 Years	American Indian/Alaska Native, Non-Hispanic
## 70	Male	70 - 79 Years	Hispanic/Latino
## 52	Male	70 - 79 Years	Black, Non-Hispanic
## 89	Female	80+ Years	Multiple/Other, Non-Hispanic
## 34	Male	70 - 79 Years	Asian, Non-Hispanic
## 106	Male	70 - 79 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 15	Female	70 - 79 Years	American Indian/Alaska Native, Non-Hispanic
## 69	Female	70 - 79 Years	Hispanic/Latino
## 51	Female	70 - 79 Years	Black, Non-Hispanic
## 124	Male	70 - 79 Years	White, Non-Hispanic
## 33	Female	70 - 79 Years	Asian, Non-Hispanic
## 88	Male	70 - 79 Years	Multiple/Other, Non-Hispanic
## 105	Female	70 - 79 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 14	Male	60 - 69 Years	American Indian/Alaska Native, Non-Hispanic
## 68	Male	60 - 69 Years	Hispanic/Latino
## 50	Male	60 - 69 Years	Black, Non-Hispanic
## 123	Female	70 - 79 Years	White, Non-Hispanic
## 87	Female	70 - 79 Years	Multiple/Other, Non-Hispanic
## 32	Male	60 - 69 Years	Asian, Non-Hispanic
## 104	Male	60 - 69 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 13	Female	60 - 69 Years	American Indian/Alaska Native, Non-Hispanic
## 67	Female	60 - 69 Years	Hispanic/Latino
## 49	Female	60 - 69 Years	Black, Non-Hispanic
## 122	Male	60 - 69 Years	White, Non-Hispanic
## 31	Female	60 - 69 Years	Asian, Non-Hispanic
## 86	Male	60 - 69 Years	Multiple/Other, Non-Hispanic
## 103	Female	60 - 69 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 12	Male	50 - 59 Years	American Indian/Alaska Native, Non-Hispanic
## 66	Male	50 - 59 Years	Hispanic/Latino
## 121	Female	60 - 69 Years	White, Non-Hispanic
## 48	Male	50 - 59 Years	Black, Non-Hispanic
## 85	Female	60 - 69 Years	Multiple/Other, Non-Hispanic
## 30	Male	50 - 59 Years	Asian, Non-Hispanic
## 102	Male	50 - 59 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 11	Female	50 - 59 Years	American Indian/Alaska Native, Non-Hispanic
## 65	Female	50 - 59 Years	Hispanic/Latino
## 47	Female	50 - 59 Years	Black, Non-Hispanic
## 120	Male	50 - 59 Years	White, Non-Hispanic
## 29	Female	50 - 59 Years	Asian, Non-Hispanic

## 84	Male 50 - 59 Years	Multiple/Other, Non-Hispanic
## 101	Female 50 - 59 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 10	Male 40 - 49 Years	American Indian/Alaska Native, Non-Hispanic
## 64	Male 40 - 49 Years	Hispanic/Latino
## 46	Male 40 - 49 Years	Black, Non-Hispanic
## 119	Female 50 - 59 Years	White, Non-Hispanic
## 28	Male 40 - 49 Years	Asian, Non-Hispanic
## 83	Female 50 - 59 Years	Multiple/Other, Non-Hispanic
## 100	Male 40 - 49 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 9	Female 40 - 49 Years	American Indian/Alaska Native, Non-Hispanic
## 63	Female 40 - 49 Years	Hispanic/Latino
## 45	Female 40 - 49 Years	Black, Non-Hispanic
## 118	Male 40 - 49 Years	White, Non-Hispanic
## 27	Female 40 - 49 Years	Asian, Non-Hispanic
## 82	Male 40 - 49 Years	Multiple/Other, Non-Hispanic
## 99	Female 40 - 49 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 8	Male 30 - 39 Years	American Indian/Alaska Native, Non-Hispanic
## 62	Male 30 - 39 Years	Hispanic/Latino
## 44	Male 30 - 39 Years	Black, Non-Hispanic
## 117	Female 40 - 49 Years	White, Non-Hispanic
## 26	Male 30 - 39 Years	Asian, Non-Hispanic
## 81	Female 40 - 49 Years	Multiple/Other, Non-Hispanic
## 98	Male 30 - 39 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 7	Female 30 - 39 Years	American Indian/Alaska Native, Non-Hispanic
## 61	Female 30 - 39 Years	Hispanic/Latino
## 43	Female 30 - 39 Years	Black, Non-Hispanic
## 116	Male 30 - 39 Years	White, Non-Hispanic
## 25	Female 30 - 39 Years	Asian, Non-Hispanic
## 80	Male 30 - 39 Years	Multiple/Other, Non-Hispanic
## 97	Female 30 - 39 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 6	Male 20 - 29 Years	American Indian/Alaska Native, Non-Hispanic
## 60	Male 20 - 29 Years	Hispanic/Latino
## 42	Male 20 - 29 Years	Black, Non-Hispanic
## 115	Female 30 - 39 Years	White, Non-Hispanic
## 24	Male 20 - 29 Years	Asian, Non-Hispanic
## 79	Female 30 - 39 Years	Multiple/Other, Non-Hispanic
## 96	Male 20 - 29 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 5	Female 20 - 29 Years	American Indian/Alaska Native, Non-Hispanic
## 59	Female 20 - 29 Years	Hispanic/Latino
## 41	Female 20 - 29 Years	Black, Non-Hispanic
## 114	Male 20 - 29 Years	White, Non-Hispanic
## 23	Female 20 - 29 Years	Asian, Non-Hispanic
## 78	Male 20 - 29 Years	Multiple/Other, Non-Hispanic
## 95	Female 20 - 29 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 2	Male 0 - 9 Years	American Indian/Alaska Native, Non-Hispanic
## 56	Male 0 - 9 Years	Hispanic/Latino
## 38	Male 0 - 9 Years	Black, Non-Hispanic
## 4	Male 10 - 19 Years	American Indian/Alaska Native, Non-Hispanic
## 113	Female 20 - 29 Years	White, Non-Hispanic
## 58	Male 10 - 19 Years	Hispanic/Latino
## 40	Male 10 - 19 Years	Black, Non-Hispanic
## 20	Male 0 - 9 Years	Asian, Non-Hispanic
## 77	Female 20 - 29 Years	Multiple/Other, Non-Hispanic
## 92	Male 0 - 9 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic

## 1	Female	0 - 9 Years	American Indian/Alaska Native, Non-Hispanic
## 22	Male	10 - 19 Years	Asian, Non-Hispanic
## 55	Female	0 - 9 Years	Hispanic/Latino
## 37	Female	0 - 9 Years	Black, Non-Hispanic
## 94	Male	10 - 19 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 3	Female	10 - 19 Years	American Indian/Alaska Native, Non-Hispanic
## 57	Female	10 - 19 Years	Hispanic/Latino
## 39	Female	10 - 19 Years	Black, Non-Hispanic
## 110	Male	0 - 9 Years	White, Non-Hispanic
## 112	Male	10 - 19 Years	White, Non-Hispanic
## 19	Female	0 - 9 Years	Asian, Non-Hispanic
## 74	Male	0 - 9 Years	Multiple/Other, Non-Hispanic
## 91	Female	0 - 9 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 21	Female	10 - 19 Years	Asian, Non-Hispanic
## 76	Male	10 - 19 Years	Multiple/Other, Non-Hispanic
## 93	Female	10 - 19 Years	Native Hawaiian/Other Pacific Islander, Non-Hispanic
## 109	Female	0 - 9 Years	White, Non-Hispanic
## 111	Female	10 - 19 Years	White, Non-Hispanic
## 73	Female	0 - 9 Years	Multiple/Other, Non-Hispanic
## 75	Female	10 - 19 Years	Multiple/Other, Non-Hispanic
##	log_odds	odds	probability
## 18	0.41783964	1.5186771211	0.6029661795
## 72	0.37355635	1.4528924341	0.5923180380
## 54	0.34723013	1.4151423585	0.5859457326
## 36	0.05495040	1.0564882106	0.5137341441
## 108	-0.07060245	0.9318322701	0.4823567162
## 17	-0.08506536	0.9184522551	0.4787464753
## 71	-0.12934865	0.8786675680	0.4677078494
## 53	-0.15567487	0.8558374077	0.4611596922
## 126	-0.30393567	0.7379083332	0.4245956585
## 35	-0.44795460	0.6389336917	0.3898471884
## 90	-0.53081076	0.5881279444	0.3703278105
## 107	-0.57350745	0.5635453632	0.3604278945
## 125	-0.80684067	0.4462657423	0.3085641381
## 16	-0.81089331	0.4444608468	0.3077001691
## 70	-0.85517660	0.4252080924	0.2983480761
## 52	-0.88150282	0.4141600359	0.2928664546
## 89	-1.03371576	0.3556828699	0.2623643610
## 34	-1.17378255	0.3091951793	0.2361719507
## 106	-1.29933540	0.2727129777	0.2142768892
## 15	-1.31379831	0.2687971402	0.2118519436
## 69	-1.35808160	0.2571536279	0.2045522697
## 51	-1.38440782	0.2504720811	0.2003020178
## 124	-1.53266862	0.2159585853	0.1776035697
## 33	-1.67668755	0.1869923539	0.1575345901
## 88	-1.75954371	0.1721233833	0.1468474955
## 105	-1.80224040	0.1649289674	0.1415785614
## 14	-1.92575082	0.1457662713	0.1272216463
## 68	-1.97003411	0.1394520993	0.1223852230
## 50	-1.99636033	0.1358287566	0.1195855940
## 123	-2.03557362	0.1306055428	0.1155182226
## 87	-2.26244871	0.1040952730	0.0942810603
## 32	-2.28864006	0.1014042715	0.0920681662
## 104	-2.41419291	0.0894394955	0.0820967992



## 13 -2.42865582 0.0881552496 0.0810134855  
## 67 -2.47293911 0.0843366199 0.0777771573  
## 49 -2.49926533 0.0821453264 0.0759096993  
## 122 -2.64752613 0.0708262111 0.0661416487  
## 31 -2.79154506 0.0613263877 0.0577827786  
## 86 -2.87440122 0.0564499302 0.0534336068  
## 103 -2.91709791 0.0540904351 0.0513147955  
## 12 -3.10556606 0.0447991525 0.0428782436  
## 66 -3.14984935 0.0428585832 0.0410972148  
## 121 -3.15043113 0.0428336559 0.0410742938  
## 48 -3.17617556 0.0417450013 0.0400721878  
## 85 -3.37730622 0.0341392946 0.0330122787  
## 30 -3.46845530 0.0311651344 0.0302232235  
## 102 -3.59400815 0.0274879337 0.0267525611  
## 11 -3.60847105 0.0270932393 0.0263785587  
## 65 -3.65275434 0.0259196388 0.0252647847  
## 47 -3.67908056 0.0252461765 0.0246245019  
## 120 -3.82734137 0.0217674103 0.0213036842  
## 29 -3.97136030 0.0188477771 0.0184991100  
## 84 -4.05421646 0.0173490686 0.0170532112  
## 101 -4.09691314 0.0166239119 0.0163520764  
## 10 -4.13287190 0.0160367566 0.0157836383  
## 64 -4.17715519 0.0153420909 0.0151102678  
## 46 -4.20348141 0.0149434619 0.0147234426  
## 119 -4.33024637 0.0131643038 0.0129932567  
## 28 -4.49576114 0.0111561859 0.0110330986  
## 83 -4.55712146 0.0104922178 0.0103832742  
## 100 -4.62131399 0.0098398581 0.0097439787  
## 9 -4.63577690 0.0096985693 0.0096054106  
## 63 -4.68006019 0.0092784554 0.0091931571  
## 45 -4.70638641 0.0090373760 0.0089564334  
## 118 -4.85464721 0.0077920818 0.0077318347  
## 27 -4.99866614 0.0067469405 0.0067017243  
## 82 -5.08152230 0.0062104476 0.0061721160  
## 99 -5.12421899 0.0059508632 0.0059156600  
## 8 -5.13141422 0.0059081991 0.0058734973  
## 62 -5.17569751 0.0056522730 0.0056205044  
## 44 -5.20202373 0.0055054117 0.0054752681  
## 117 -5.35755221 0.0047124270 0.0046903242  
## 26 -5.49430346 0.0041101183 0.0040932944  
## 81 -5.58442730 0.0037559002 0.0037418462  
## 98 -5.61985631 0.0036251620 0.0036120676  
## 7 -5.63431922 0.0035731089 0.0035603873  
## 61 -5.67860251 0.0034183322 0.0034066870  
## 43 -5.70492873 0.0033295147 0.0033184658  
## 116 -5.85318953 0.0028707283 0.0028625108  
## 25 -5.99720846 0.0024856814 0.0024795181  
## 80 -6.08006462 0.0022880288 0.0022828057  
## 97 -6.12276131 0.0021923937 0.0021875976  
## 6 -6.18387602 0.0020624184 0.0020581736  
## 60 -6.22815931 0.0019730804 0.0019691950  
## 42 -6.25448553 0.0019218144 0.0019181281  
## 115 -6.35609453 0.0017361339 0.0017331250  
## 24 -6.54676526 0.0014347491 0.0014326936

## 79 -6.58296962 0.0013837340 0.0013818219  
## 96 -6.67231811 0.0012654619 0.0012638625  
## 5 -6.68678102 0.0012472913 0.0012457375  
## 59 -6.73106430 0.0011932623 0.0011918401  
## 41 -6.75739052 0.0011622581 0.0011609088  
## 114 -6.90565133 0.0010021062 0.0010011030  
## 23 -7.04967026 0.0008676950 0.0008669428  
## 78 -7.13252642 0.0007986990 0.0007980616  
## 95 -7.17522310 0.0007653150 0.0007647297  
## 2 -7.23292518 0.0007224046 0.0007218831  
## 56 -7.27720847 0.0006911121 0.0006906348  
## 38 -7.30353469 0.0006731552 0.0006727023  
## 4 -7.37669708 0.0006256640 0.0006252728  
## 113 -7.40855633 0.0006060450 0.0006056779  
## 58 -7.42098036 0.0005985620 0.0005982040  
## 40 -7.44730658 0.0005830098 0.0005826701  
## 20 -7.59581442 0.0005025505 0.0005022981  
## 77 -7.63543142 0.0004830302 0.0004827970  
## 92 -7.72136727 0.0004432541 0.0004430578  
## 1 -7.73583018 0.0004368895 0.0004366987  
## 22 -7.73958632 0.0004352516 0.0004350622  
## 55 -7.78011346 0.0004179647 0.0004177901  
## 37 -7.80643968 0.0004071049 0.0004069392  
## 94 -7.86513916 0.0003838959 0.0003837486  
## 3 -7.87960207 0.0003783836 0.0003782405  
## 57 -7.92388536 0.0003619931 0.0003618621  
## 39 -7.95021158 0.0003525876 0.0003524633  
## 110 -7.95470049 0.0003510084 0.0003508852  
## 112 -8.09847239 0.0003040032 0.0003039108  
## 19 -8.09871942 0.0003039281 0.0003038357  
## 74 -8.18157558 0.0002797608 0.0002796826  
## 91 -8.22427226 0.0002680674 0.0002679955  
## 21 -8.24249132 0.0002632276 0.0002631584  
## 76 -8.32534748 0.0002422967 0.0002422380  
## 93 -8.36804416 0.0002321692 0.0002321153  
## 109 -8.45760549 0.0002122798 0.0002122347  
## 111 -8.60137739 0.0001838524 0.0001838186  
## 73 -8.68448058 0.0001691913 0.0001691627  
## 75 -8.82825248 0.0001465341 0.0001465126