Independent study with changes

```
df <- read.csv('C:/Users/17143/Desktop/Indpendent_Study/DIADEMwithProteomics_remission.csv', header = T
```

Data cleaning

```
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```r
library(tidyr)
sub<-df %>%select(which(colnames(df)=="remission"))
data <- df %>% mutate(ExSmoker = ifelse(ExSmoker == "No",0,1))
nums <- unlist(lapply(data, is.numeric))
data <- data[ , nums]
c <- c(2:11645)
data <- data[,c]
data[is.na(data)] <- 0
data <- data %>% select(-6786,-1282,-11614,-1246,-6785,-6781)
data <- data[,!grepl("hba1c",colnames(data))]
data <- data[,!grepl("HbA1c",colnames(data))]
data <- data[,!grepl("HOMA",colnames(data))]
data <- data[,!grepl("homa",colnames(data))]
data <- data[,!grepl("remission",colnames(data))]
data <- data[,!grepl("compremission",colnames(data))]
data <- data[,!grepl("_3",colnames(data))]
data <- data[,!grepl("_6",colnames(data))]
data <- data[,!grepl("_9",colnames(data))]
data<-data.frame(sub,data)
#data$x_12_0 <- data$x_12 - data$x_0
library(tidyselect)
df_12_0<-data %>% select(ends_with(c("_0","_12")))

df_12d<-df_12_0 %>% select(vars_select(names(df_12_0), ends_with("_12")))
df_0d<-df_12_0 %>% select(vars_select(names(df_12_0), ends_with("_0")))
#df_12d %>% select_if(not_all_na)
#df_0d %>% select_if(not_all_na)
df_12<-names(df_12d)
df_0<-names(df_0d)
#d=0
```

```r
for(i in seq_along(df_0)) {
    ref<-substr(df_0[i],1,nchar(df_0[i])-2)
    #print(ref)

    ismatch <- sum(grepl(paste0("*", ref), df_12)) > 0
    #print(ismatch)
    name <-paste0(ref,"_12")
    if(ismatch) {
      if(any(names(df_12_0) == name)==TRUE){
        df_12_0[paste0(ref,"_12_0")] <-  df_12_0[paste0(ref,"_12")]-df_12_0[paste0(ref,"_0")]
      }
}
}

}

n<-(5428:7826)
df_12_0<-df_12_0[,n]
data<-data %>% select(!ends_with(c("_0","_12")))
data<-data.frame(data,df_12_0)
data <- as.data.frame(sapply(data, as.numeric))
data[is.na(data)] <- 0
```

Train and Test data

```r
smp_size <- 0.8*nrow(data)
train_ind <- sample(seq_len(nrow(data)),size=smp_size)
data_train <- (data[train_ind,])
data_test <- (data[-train_ind,])
```

Lasso version of Logistic Regression

```r
library(glmnet)
```

```
## Loading required package: Matrix
```

```
##
## Attaching package: 'Matrix'
```

```
## The following objects are masked from 'package:tidyr':
##
##     expand, pack, unpack
```

```
## Loaded glmnet 4.0-2
```

```r
X_train=model.matrix(remission~.,data_train)[,-1]
Y_train=data_train$remission
X_te=model.matrix(remission~.,data_test)[,-1]
Y_te=data_test$remission
```

Different way to run lasso but doesn't seem to run accurately both error is 0

```r
set.seed(123)
cv.lasso <- cv.glmnet(X_train, Y_train, alpha = 1, family = "binomial")
plot(cv.lasso)
```
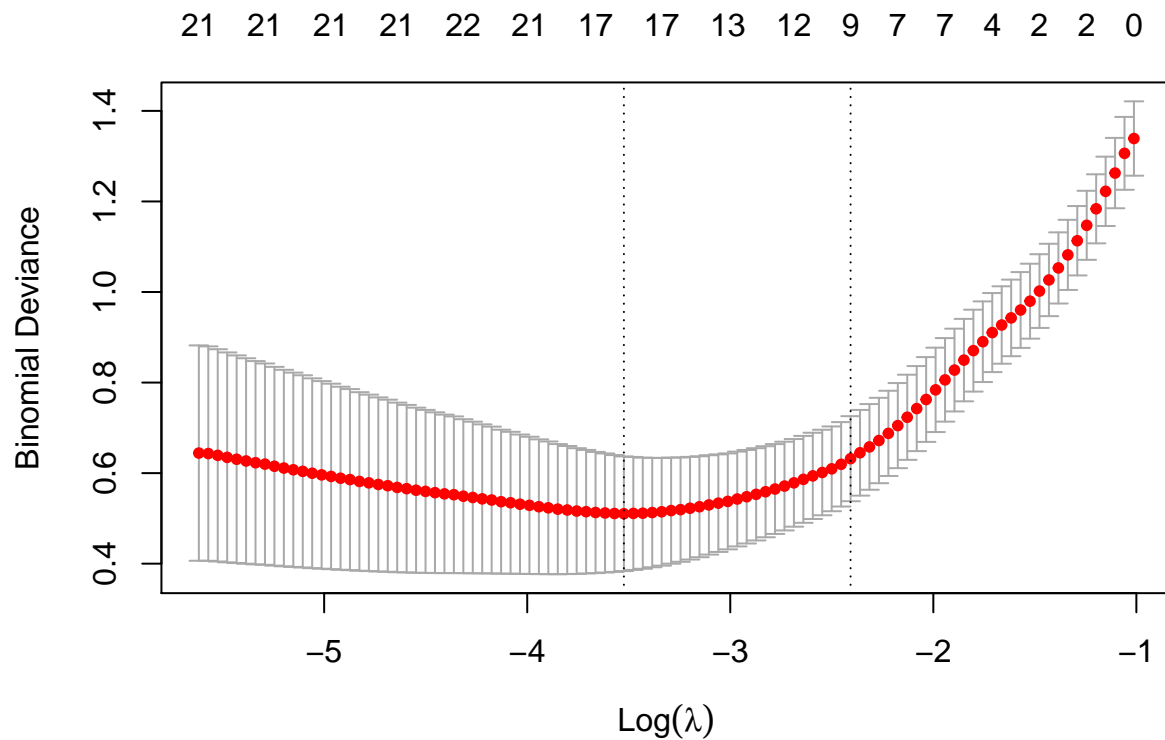
```
cv.lasso$lambda.min
```

```
## [1] 0.02948501
```

```
cv.lasso$lambda.1se
```

```
## [1] 0.09004297
```

```
#coef(cv.lasso, cv.lasso$lambda.min)
```

```
#Using lambda.min
model <- glmnet(X_train, Y_train, alpha = 1, family = "binomial",lambda = cv.lasso$lambda.min)
# regression coefficients
coeffs<-coef(model)
coeffs<-as.data.frame(as.matrix(coeffs))
coeford<-coeffs[order(-coeffs$s0), , drop = FALSE]
row_sub = apply(coeford, 1, function(row) all(row !=0 ))
coef0<-coeford[row_sub,, drop = FALSE]
#View(coef0)
data.frame(coef0)
```

```
##                               s0
## (Intercept)         5.576954e+00
## cv_12_0             4.721193e+00
## QUICKI_12_0         7.541397e-01
## LymphocyteAuto_12_0 5.859717e-01
## HADS_Depression3_12_0  1.173015e-01
## dneck120            1.163967e-01
```

```
## Triglyceride_12_0        1.127194e-01
## Folate_12_0              8.101889e-02
## FT4_12_0                 3.325813e-02
## BilirubinT_12_0          2.912162e-02
## IPAQ_1_12_0              1.943096e-02
## lbgi_12_0                1.363167e-02
## Sodium_12_0              7.586083e-04
## PRL_12_0                 7.779636e-05
## Axis3MaxCounts_12_0      4.021943e-06
## HR_Standing_2_LAST      -3.765325e-02
## lacr_12_0               -9.869570e-02
## diabmedl                -1.392963e+00
```

```r
probabilities <- model %>% predict(newx = X_te)
predicted.classes <- ifelse(probabilities > 0.5, "pos", "neg")
# Model accuracy
observed.classes <- data_test$remission
mean(predicted.classes == observed.classes)
```

```
## [1] 0
```

```r
#Using lambda.1se
model1 <- glmnet(X_train, Y_train, alpha = 1, family = "binomial",lambda = cv.lasso$lambda.1se)
# regression coefficients
coeffs1<-coef(model1)
coeffs1<-as.data.frame(as.matrix(coeffs1))
coeford1<-coeffs1[order(-coeffs1$s0), , drop = FALSE]
row_sub = apply(coeford1, 1, function(row) all(row !=0 ))
coef1<-coeford1[row_sub,, drop = FALSE]
#View(coef1)
data.frame(coef1)
```

```
##                             s0
## (Intercept)        2.850405421
## cv_12_0            1.805469211
## LymphocyteAuto_12_0  0.249533560
## Folate_12_0        0.055981991
## dneck120           0.040377952
## Triglyceride_12_0  0.016155462
## FT4_12_0           0.009371377
## Sodium_12_0        0.006284426
## HR_Standing_2_LAST -0.015567546
## diabmedl           -0.705913113
```

```r
probabilities <- model1 %>% predict(newx = X_te)
predicted.classes <- ifelse(probabilities > 0.5, "pos", "neg")
observed.classes <- data_test$remission
mean(predicted.classes == observed.classes)
```

```
## [1] 0
```

Random forest

```r
library(randomForest)
```

```
## randomForest 4.6-14
```

```
## Type rfNews() to see new features/changes/bug fixes.

##
## Attaching package: 'randomForest'

## The following object is masked from 'package:dplyr':
##
##     combine
```

```r
data$remission <- as.character(data$remission)
data$remission <- as.factor(data$remission)
fit <- randomForest(remission~., data)
print(fit)
```

```
##
## Call:
##  randomForest(formula = remission ~ ., data = data)
##                Type of random forest: classification
##                      Number of trees: 500
## No. of variables tried at each split: 53
##
##          OOB estimate of  error rate: 14.29%
## Confusion matrix:
##    0  1 class.error
## 0 18  9  0.33333333
## 1  1 42  0.02325581
```

```r
imp<-importance(fit)
rfimp<-data.frame(imp)
rfimp<- rfimp[order(-rfimp$MeanDecreaseGini), , drop = FALSE]
row_sub = apply(rfimp, 1, function(row) all(row !=0 ))
rfimp<-rfimp[row_sub,, drop = FALSE]
data.frame(rfimp)
```

```
##                                    MeanDecreaseGini
## Folate_12_0                             0.6949215781
## BEN                                     0.6732706046
## QUICKI_12_0                             0.6445738774
## hbaf                                    0.4326952147
## lALT_12_0                               0.3732597407
## LDLCalc_12_0                            0.3613288126
## Cholesterol_12_0                        0.3330551417
## Glucose_12_0                            0.3194965142
## Urea_12_0                               0.3109788516
## Hct_12_0                                0.2855673469
## Fibro_ValidMeasuresNumber_12_0          0.2848778426
## MDRD4_12_0                              0.2826000897
## Creatinine_12_0                         0.2618182685
## CalciumCorr_12_0                        0.2561314440
## VitD_12_0                               0.2483706235
## dwaist120                               0.2455817452
## SBP_Standing_Avg_12_0                   0.2400449932
## FT4_12_0                                0.2309291070
## DBP_Sitting_2_12_0                      0.2272379814
## gmi_12_0                                0.2232357232
## Fibro_CAP_med_12_0                      0.2210682189
```

```
## ADP                                0.2171457023
## SBP_Sitting_2_12_0                  0.2116349498
## lvitD_12_0                          0.2105950699
## TANITAIdealBodyWeight_12_0          0.1956150835
## MPV_12_0                            0.1927347403
## HR_Sitting_2_12_0                   0.1912121052
## lAST_12_0                           0.1911282916
## CKDEPI_12_0                         0.1833670820
## TANITABoneMass_12_0                 0.1790042723
## Albumin_12_0                        0.1774163946
## HR_Sitting_1_12_0                   0.1730144552
## HR_Standing_2_12_0                  0.1708104013
## TANITATBW_12_0                      0.1697073103
## Waistcircumference_12_0             0.1692776194
## min_sensor_12_0                     0.1639926198
## DBP_Standing_2_12_0                 0.1634344379
## nighttime_max_sens_glucose_12_0     0.1614362409
## MCV_12_0                            0.1562447413
## TANITAMetabolicAge_12_0             0.1482540322
## SBP_Sitting_1_12_0                  0.1445726372
## SBP_Sitting_Avg_12_0                0.1421247295
## DBP_Standing_1_12_0                 0.1406801210
## daytime_max_sensor_glucose_12_0     0.1405903548
## MCHC_12_0                           0.1368593798
## BilirubinT_12_0                     0.1357907720
## percent_time_70_180_12_0            0.1357321621
## SBP_Standing_1_12_0                 0.1320561565
## MaxLengthofSedentaryBreaks_1        0.1315668456
## Calorimetry_RMR_12_0                0.1286563746
## UricAcid_12_0                       0.1264756470
## average_sensor_12_0                 0.1250972020
## LymphocyteAuto_12_0                 0.1230406625
## DBP_Sitting_1_12_0                  0.1219302993
## daytime_avg_sensor_glucose_12_0     0.1203125603
## HR_Standing_1_12_0                  0.1197537516
## dneck120                            0.1186298427
## Potassium_12_0                      0.1184840458
## d_weight_120                        0.1165018201
## Neckcircumference_12_0              0.1153707211
## TotalMVPA_12_0                      0.1153126289
## Calcium_12_0                        0.1111131284
## Platelet_12_0                       0.1110426086
## q1_sensor_12_0                      0.1095589179
## VectorMagnitudeCPM_12_0             0.1075358064
## RD                                  0.1074793729
## BQC                                 0.1067292422
## VitB12_12_0                         0.1064114817
## max_sensor_12_0                     0.1052357222
## lPTH_12_0                           0.1041075546
## TotalProtein_12_0                   0.1039674762
## nighttime_min_sens_glucose_12_0     0.1036518162
## standard_deviation_12_0             0.1026460326
## PDWifavailable_12_0                 0.1021893159
## TotalTimeinSedentaryBreaks_1        0.1009814270
```

```
## WBC_12_0                             0.0997898019
## DBP_Standing_Avg_12_0                0.0995965413
## AGR2_12_0                            0.0968379300
## BES                                  0.0955955936
## dfatmass120                          0.0953339152
## Height_12_0                          0.0938629761
## daytime_sd_12_0                      0.0922292204
## median_sensor_12_0                   0.0919560134
## lCPeptide_12_0                       0.0880324324
## CDK2cyclinA_12_0                     0.0858411385
## AUH                                  0.0853761039
## inLight_12_0                         0.0846491448
## lInsulin_12_0                        0.0846489488
## q3_sensor_12_0                       0.0845349378
## IWQOL_DistressScaleAdj_12_0          0.0832180471
## average_auc_per_day_12_0             0.0829330169
## TANITAWeight_12_0                    0.0826741408
## l2CDK2cyclinA_12_0                   0.0823121499
## diabmedl                             0.0822246679
## average_auc_180_12_0                 0.0820961635
## HR_Sitting_2_LAST                    0.0807080110
## SBP_Standing_2_12_0                  0.0804908942
## AUQ                                  0.0803471789
## TANITAMuscleMass_12_0                0.0798923521
## StepsPerMinute_12_0                  0.0796666017
## IWQOL_SexCount_12_0                  0.0792815014
## AvgTimeperFreedson1998Bou            0.0759784636
## AVR                                  0.0750635035
## cv_12_0                              0.0748465330
## HR_Standing_Avg_12_0                 0.0743733170
## Hemoglobin_12_0                      0.0739367784
## ADR                                  0.0738185015
## Axis3Counts_12_0                     0.0735752993
## min_spent_over_250_day_12_0          0.0726631883
## nighttime_auc_12_0                   0.0721770685
## NeutrophilAuto_12_0                  0.0720053229
## day_night_sensor_ratio_12_0          0.0713342745
## Ficolin3_12_0                        0.0676046225
## IWQOL_EsteemCount_12_0               0.0668345296
## HR_Sitting_Avg_12_0                  0.0666085506
## l2CD23_12_0                          0.0664263016
## percent_time_over_250_12_0           0.0660864596
## AUI                                  0.0660798183
## TANITAFatMass_12_0                   0.0659613003
## Sodium_12_0                          0.0655710389
## DMedLast                             0.0646990583
## AUE                                  0.0642826304
## PolyUbiquitinK48_12_0                0.0626464722
## l2IL17sR_12_0                        0.0620562149
## StepsCounts_12_0                     0.0597127018
## Fibro_E_med_12_0                     0.0593142225
## EMAP2_12_0                           0.0593108956
## IWQOL_TotalCount_12_0                0.0589646328
## percent_time_over_200_12_0           0.0578850302
```

```
## l2a2Antiplasmin_12_0                 0.0566658773
## IWQOL_TotalScaleAdj_12_0             0.0550713897
## AQX                                  0.0549618304
## TANITABMI_12_0                       0.0544840336
## GPNMB_12_0                           0.0543725325
## SMAC_12_0                            0.0543024673
## min_spent_70_180_day_12_0            0.0540612224
## Semaphorin3E_12_0                    0.0533998778
## l2GOR                                0.0531220779
## RDWCV_12_0                           0.0523391874
## IWQOL_PhysicalScaleAdj_12_0          0.0520334467
## Axis2CPM_12_0                        0.0517003650
## pc1                                  0.0513720618
## AverageMVPAPerday_12_0               0.0509094665
## Fassoluble_12_0                      0.0502585693
## VectorMagnitudeCounts_12_0           0.0501178659
## l2BASI_12_0                          0.0493899638
## l2IL4_12_0                           0.0492639222
## Hgb_12_0                             0.0491961905
## HR_Standing_Avg_screening            0.0489460351
## min_spent_over_200_day_12_0          0.0483860789
## IWQOL_SexScaleAdj_12_0               0.0475661509
## estimated_a1c_12_0                   0.0474868984
## DBP_Sitting_Avg_12_0                 0.0472261905
## DPL                                  0.0466330143
## l2Mcl1_12_0                          0.0458017510
## percent_time_70_180_day_12_0         0.0452659341
## IWQOL_WorkCount_12_0                 0.0451973856
## CPeptide_12_0                        0.0451755981
## l2EIZ                                0.0448093027
## Diabetesmedno_LAST                   0.0446919649
## l2TGFb3_12_0                         0.0446270270
## HR_Standing_Avg_LAST                 0.0440559997
## Enterokinase_12_0                    0.0440558160
## TroponinIskeletalfasttwitc           0.0439422000
## D_steps120                           0.0435266973
## Diabetesmedno_12_0                   0.0432292631
## min_spent_over_200_night_12_0        0.0432113114
## insulinpmol_12_0                     0.0431959541
## Axis2Counts_12_0                     0.0423574602
## Axis3MaxCounts_12_0                  0.0422123308
## CNTN2_12_0                           0.0420073831
## hbgi_12_0                            0.0416553137
## pc11                                 0.0415398562
## SECTM1_12_0                          0.0414119309
## AUC                                  0.0412693017
## percent_time_70_180_night_12_0       0.0411820180
## l2SECTM1_12_0                        0.0403609565
## Chloride_12_0                        0.0403200000
## BMPRII_12_0                          0.0396334362
## FSTL3_12_0                           0.0395446083
## pc31                                 0.0389593563
## IP10_12_0                            0.0385670831
## HR_Standing_1_LAST                   0.0384748833
```

```
## Fucosyltransferase3_12_0            0.0384643077
## FCN1_12_0                           0.0383741716
## l2Siglec3_12_0                      0.0382392333
## FGA                                 0.0380789961
## percent_time_over_180_12_0          0.0380491837
## l2Tenascin_12_0                     0.0379041789
## TotalTimeinFreedson1998Bo           0.0378724568
## REG4_12_0                           0.0375603002
## HR_Standing_2_LAST                  0.0373790557
## MMP12_12_0                          0.0372583844
## HCE000342_12_0                      0.0372207039
## l2MEPE_12_0                         0.0371542064
## IWQOL_DistressCount_12_0            0.0371159030
## l2FOT                              0.0368103437
## a2Antiplasmin_12_0                  0.0366457132
## RSPO4_12_0                          0.0365087413
## MFGM_12_0                           0.0364648221
## AUB                                 0.0360976801
## NrCAM_12_0                          0.0360656056
## lIPAQ_WalkingMETs_12_0              0.0358588584
## MCH_12_0                            0.0356947925
## GranzymeB_12_0                      0.0356716115
## l2MICA_12_0                         0.0351554069
## FETUB_12_0                          0.0348033126
## l2IL18BPa_12_0                      0.0343376238
## l2IP10_12_0                         0.0343193348
## Light_12_0                          0.0342567100
## EQ5D_Scale_12_0                     0.0341718789
## IWQOL_PhysicalCount_12_0            0.0339805321
## AUJ                                 0.0337048359
## modd_12_0                           0.0335960429
## l2EPI                               0.0335885147
## l2MMP7_12_0                         0.0333177076
## total_sensor_readings_12_0          0.0331549842
## TANITABMR_12_0                      0.0329251701
## Axis3AverageCounts_12_0             0.0327788360
## l2Soggy1_12_0                       0.0327028632
## proteinZinhibitor_12_0              0.0325948053
## AlkPhos_12_0                        0.0325308933
## TSG6_12_0                           0.0317313211
## Spondin1_12_0                       0.0313032942
## l2ARSB_12_0                         0.0312805452
## Axis1Counts_12_0                    0.0312428571
## tst                                 0.0307678161
## AUP                                 0.0307638528
## l2CathepsinB_12_0                   0.0307315609
## l2BAFF_12_0                         0.0306092167
## nighttime_sd_12_0                   0.0300462349
## HIF1a_12_0                          0.0300087302
## JAG1_12_0                           0.0297388289
## HDL_12_0                            0.0296435795
## percent_time_over_180_night_12_0    0.0295860595
## ARSB_12_0                           0.0295458432
## inMVPA_12_0                         0.0294301626
```

```
## dmusclemass120                         0.0293317350
## BTC_12_0                                0.0292524868
## ROBO2_12_0                              0.0291511438
## EPHB2_12_0                              0.0291206614
## l2IFNb_12_0                             0.0290778224
## PSMA_12_0                               0.0289753212
## cJun_12_0                               0.0286980035
## TRAILR4_12_0                            0.0285878261
## WTLOSS_12_LAST                          0.0285506200
## BAFF_12_0                               0.0284968030
## Triglyceride_12_0                       0.0282610723
## PLCG1_12_0                              0.0281762293
## l2cJun_12_0                             0.0279875476
## l2FCN1_12_0                             0.0275814361
## min_spent_over_180_12_0                 0.0272642259
## percent_time_over_250_night_12_0        0.0272014070
## Kallistatin_12_0                        0.0271530438
## MSP_12_0                                0.0270669090
## l2MRC2_12_0                             0.0269580664
## adplepratio                             0.0268245887
## Fibro_E_IQRE_med_12_0                   0.0266693878
## l2Proteinase3_12_0                      0.0266351203
## LRRT3_12_0                              0.0265347001
## MnSOD_12_0                              0.0261835765
## ITIheavychainH4_12_0                    0.0260461686
## l2Endocan_12_0                          0.0259625519
## l2DPL                                   0.0259125541
## CONA1_12_0                              0.0258986648
## l2IL1F7_12_0                            0.0258667784
## Tenascin_12_0                           0.0258528809
## lIPAQ_ModerateMETs_12_0                 0.0258494665
## percent_time_over_200_day_12_0          0.0257686346
## GGT_12_0                                0.0253263204
## Transferrin_12_0                        0.0253084321
## IL18Ra_12_0                             0.0253082389
## j_index_12_0                            0.0251554389
## IWQOL_EsteemScale_12_0                  0.0251519581
## UCreatinine_12_0                        0.0251221435
## min_spent_70_180_12_0                   0.0251221435
## l2IFNA7_12_0                            0.0250775510
## l2PGCB_12_0                             0.0249181225
## l2BCMA_12_0                             0.0249169608
## TopoisomeraseI_12_0                     0.0248762257
## BGH3_12_0                               0.0248204770
## l2CD97_12_0                             0.0246873068
## VEGFD_12_0                              0.0245445378
## l2OPG_12_0                              0.0243366581
## l2IgA_12_0                              0.0240596491
## l2CAMK1D_12_0                           0.0239878184
## HDF                                     0.0239795250
## TimeToEat_Dinner                        0.0238734556
## GFAP_12_0                               0.0238471033
## Periostin_12_0                          0.0237996461
## CD39_12_0                               0.0236290137
```

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## MMP8_12_0                          0.0236237162
## TrkB_12_0                          0.0234704762
## ARR                                0.0233154837
## min_spent_over_200_12_0            0.0232640409
## Renin_12_0                         0.0232569745
## l2PCI_12_0                         0.0231814059
## conga_1_12_0                       0.0231606061
## AUD                                0.0231093027
## Proteindisulfideisomerase_12_0     0.0230792891
## HistoneH2Az_12_0                   0.0230623974
## l2Kallistatin_12_0                 0.0230486654
## C9_12_0                            0.0230062125
## l2CNTN2_12_0                       0.0229821991
## DNG                                0.0229812121
## BNP32_12_0                         0.0226455782
## l2CHKB_12_0                        0.0224303461
## l2a2HSGlycoprotein_12_0            0.0222220817
## l2RAP_12_0                         0.0221525641
## CCL28_12_0                         0.0220144668
## l2TPSG1_12_0                       0.0220101800
## daytime_min_sensor_glucose_12_0    0.0219978614
## HR_Standing_1_screening            0.0218236701
## l2MATN3_12_0                       0.0217805528
## l2Renin_12_0                       0.0214953047
## Neckcircumference_screening        0.0214701419
## d_lhdl120                          0.0212909091
## Axis2MaxCounts_12_0                0.0212004421
## OX40Ligand_12_0                    0.0210920941
## GFRa3_12_0                         0.0210730159
## EosinophilAuto_12_0                0.0210483342
## Endocan_12_0                       0.0210360674
## CgA_12_0                           0.0208894737
## l2EMAP2_12_0                       0.0208830958
## NKp46_12_0                         0.0207149439
## PEDF_12_0                          0.0205796818
## TANITAIdealBodyWeight_LAST         0.0205000000
## GDNF_12_0                          0.0202806023
## ProteasenexinI_12_0                0.0199047619
## PACAP38_12_0                       0.0198395903
## GIIE_12_0                          0.0198328762
## EGVEGF_12_0                        0.0197608634
## l2LYPD3_12_0                       0.0196462585
## GIB_12_0                           0.0195528652
## LRRK2_12_0                         0.0195460660
## CATZ_12_0                          0.0195147739
## IPAQ_4_Trun_12_0                   0.0194809039
## BOC_12_0                           0.0194026488
## nighttime_avg_sens_glucose_12_0    0.0193968711
## l2TLR2_12_0                        0.0193925926
## IGFBP2_12_0                        0.0191925170
## PDE7A_12_0                         0.0191842105
## TIMD3_12_0                         0.0190309681
## l2bEndorphin_12_0                  0.0186994296
## ATS15_12_0                         0.0186970760
```

```
## l2FSTL1_12_0                     0.0186852002
## Plasmin_12_0                     0.0185617667
## GGE                              0.0185333333
## Semaphorin3A_12_0                0.0184063647
## GPC6_12_0                        0.0183655706
## l2CCL28_12_0                     0.0183627706
## MMP10_12_0                       0.0182554589
## LIN7B_12_0                       0.0181656140
## d_lpth120                        0.0180100906
## ARX                             0.0180000000
## HADS_TotalDepression_12_0        0.0179978210
## l2TLR4MD2complex_12_0            0.0179299867
## XG                              0.0178374194
## CAMK1D_12_0                      0.0177948402
## HR_Sitting_1_screening           0.0177625596
## TACI_12_0                        0.0175848596
## HADS_Depression3_12_0            0.0175704949
## DBP_Sitting_2_LAST               0.0175671088
## l2FAM3D_12_0                     0.0173571429
## MATN3_12_0                       0.0173251068
## l2IL6sRa_12_0                    0.0172400412
## min_spent_over_120_12_0          0.0172324831
## p27Kip1_12_0                     0.0171818182
## HGFA_12_0                        0.0171664661
## l2LRRK2_12_0                     0.0170666667
## NRX3B_12_0                       0.0170479063
## HCE004331_12_0                   0.0170475996
## Moderate_12_0                    0.0170000000
## Osteopontin_12_0                 0.0169588235
## HOC                             0.0169182046
## Thrombin_12_0                    0.0169032141
## QUACKI                          0.0168690154
## AMPKa1b1g1_12_0                  0.0168638662
## l2GA7331protein_12_0             0.0167978918
## Galectin8_12_0                   0.0167555556
## TFF3_12_0                        0.0167142857
## l2TAFI_12_0                      0.0166532880
## l2Enterokinase_12_0              0.0166352201
## l2IL8_12_0                       0.0166254100
## resistin_12_0                    0.0165989160
## l2MRCKB_12_0                     0.0165942857
## l2GDF9_12_0                      0.0165838022
## min_spent_over_250_night_12_0    0.0165658953
## ZI                              0.0165517241
## gp130soluble_12_0                0.0163902439
## l2BCAM_12_0                      0.0163878788
## IFNg_12_0                        0.0163809524
## l2IFNaA_12_0                     0.0162722222
## l2GGE                           0.0162249912
## Axis1CPM_12_0                    0.0160987760
## ARS                             0.0160714286
## Fibro_E_IQR_12_0                 0.0160173913
## l2eIF5_12_0                      0.0160000000
## HR_Sitting_Avg_screening         0.0159079070
```

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## l2FFR                               0.0158680660
## FGFR4_12_0                          0.0158237861
## l2gp130soluble_12_0                 0.0157792208
## IL1F7_12_0                          0.0157657658
## CAPG_12_0                           0.0157142857
## total_auc_12_0                      0.0157130952
## HR_Sitting_Avg_LAST                 0.0156451269
## l2HCE004331_12_0                    0.0155857143
## IWQOL_Esteem3_12_0                  0.0155086849
## FAM3B_12_0                          0.0154691877
## StepsAverageCounts_12_0             0.0153903509
## l2CHL1_12_0                         0.0153757576
## l2IFN10_12_0                        0.0153682680
## d_chol120                           0.0152380952
## ZJ                                  0.0152111111
## l2IL1RAcP_12_0                      0.0151959596
## UNC5H3_12_0                         0.0151773237
## l2EGVEGF_12_0                       0.0151223135
## IL2sRa_12_0                         0.0151148936
## AST_12_0                            0.0151047401
## l2VEGF_12_0                         0.0150894309
## NOTC2_12_0                          0.0149792978
## l2ZNRF3_12_0                        0.0149393939
## SPD_12_0                            0.0148571429
## l2MPIF1_12_0                        0.0148484848
## l2sTie2_12_0                        0.0148333333
## DR6_12_0                            0.0146496970
## l2proteinZinhibitor_12_0            0.0146428571
## l2SGTA_12_0                         0.0146301925
## Kras_12_0                           0.0146086957
## DGE                                 0.0145884640
## EP15R_12_0                          0.0145777778
## Macrophagemannosereceptor_12_0      0.0145454545
## IL1F8_12_0                          0.0145425101
## Galectin2_12_0                      0.0145281385
## av_awakening                        0.0145174973
## GRN_12_0                            0.0145174973
## HR_Standing_2_screening             0.0144950363
## l2Aminoacylase1_12_0                0.0144927536
## TANITAFFM_12_0                      0.0144857143
## l2IL5_12_0                          0.0144510272
## Elafin_12_0                         0.0144414716
## l2ADAM9_12_0                        0.0144180563
## IgA_12_0                            0.0143675214
## percent_time_over_200_night_12_0    0.0143624694
## EBP2_12_0                           0.0143490355
## RNaseH1_12_0                        0.0143307758
## FN14_12_0                           0.0143163399
## TCCR_12_0                           0.0142930403
## l2CSH_12_0                          0.0142725490
## GHC2_12_0                           0.0141493268
## MIS_12_0                            0.0141415275
## MIP5_12_0                           0.0140698413
## Vitronectin_12_0                    0.0140480726
```

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## l2LCK_12_0                             0.0140394737
## IL10_12_0                              0.0139777427
## l2ANGL4_12_0                           0.0139428571
## IL17RC_12_0                            0.0139393939
## YKL40_12_0                             0.0139213251
## l2EGV                                  0.0139000000
## AMPKa2b2g1_12_0                        0.0138888889
## l2CJQ                                  0.0138400000
## Lymphotactin_12_0                      0.0136606061
## IL10Rb_12_0                            0.0136362319
## Corticotropinlipotropin_12_0           0.0135501832
## l2EphrinA3_12_0                        0.0135168961
## CUL                                    0.0134938410
## bEndorphin_12_0                        0.0134603175
## l2WIF1_12_0                            0.0134472727
## l2TIG2_12_0                            0.0134292374
## l2MIP1a_12_0                           0.0133983648
## l2Transferrin_12_0                     0.0133981800
## IL9_12_0                               0.0133636364
## SBP_Sitting_2_screening                0.0133333333
## l2SonicHedgehog_12_0                   0.0133329227
## NormScale_40_12_0                      0.0133082632
## GFRa1_12_0                             0.0133025641
## r_mage_12_0                            0.0132609524
## FAM3D_12_0                             0.0132452620
## Ckine_12_0                             0.0132452620
## l2TopoisomeraseI_12_0                  0.0132452620
## BNY                                    0.0132183908
## PUR8_12_0                              0.0130987013
## IL1F6_12_0                             0.0130909091
## l2FGA                                  0.0130769231
## DCSIGNR_12_0                           0.0130658331
## GOT1_12_0                              0.0130614192
## l2IL22RA1_12_0                         0.0130089127
## ERBB3_12_0                             0.0129807692
## l2GNS_12_0                             0.0129562998
## DYRK3_12_0                             0.0129497988
## Lectinmannosebinding2_12_0             0.0129228202
## PESC_12_0                              0.0129223417
## l2IDS_12_0                             0.0128866978
## MIP3b_12_0                             0.0128814526
## IWQOL_Esteem1_12_0                     0.0128000000
## PLXC1_12_0                             0.0127627264
## IL22RA1_12_0                           0.0127348485
## OO                                     0.0127067745
## l2CSK21_12_0                           0.0125962733
## GPDA_12_0                              0.0125714286
## l2Macrophagemannosereceptor_12_0       0.0125023090
## Axis1AverageCounts_12_0                0.0124537063
## Time_12_0                              0.0124253968
## l2BMPER_12_0                           0.0124102564
## TRAILR2_12_0                           0.0123753501
## l2FGF5_12_0                            0.0122713043
## l2FSTL3_12_0                           0.0122656450
```

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## MEPE_12_0                            0.0122280702
## DSCAM_12_0                           0.0122231228
## ENC                                  0.0121904762
## I309_12_0                            0.0120996078
## l2IL1sRI_12_0                        0.0120979069
## HistoneH12_12_0                      0.0120698752
## Properdin_12_0                       0.0120294599
## FOT                                  0.0119974359
## OLR1_12_0                            0.0119276088
## l2Lipocalin2_12_0                    0.0119276088
## CTACK_12_0                           0.0117747184
## HER                                  0.0117158730
## CathepsinD_12_0                      0.0116998749
## auc_over_180_12_0                    0.0116666667
## PDGFCC_12_0                          0.0116099773
## l2IL13_12_0                          0.0115887135
## IMDH1_12_0                           0.0115734694
## l2PPAC_12_0                          0.0115555556
## l2CRDL1_12_0                         0.0115348837
## IPAQ_7_12_0                          0.0115302782
## Sphingosinekinase1_12_0              0.0115238095
## CD30_12_0                            0.0115227273
## CYTN_12_0                            0.0115190476
## UMicroalb_12_0                       0.0114205047
## PSP_12_0                             0.0114063150
## UMALBRatio_12_0                      0.0113890744
## l2VEGFsR3_12_0                       0.0113832753
## MIC1_12_0                            0.0113815608
## EIX                                  0.0113797980
## l2PDL2_12_0                          0.0113510520
## VectorMagnitudeAverageCounts_        0.0113086304
## IWQOL_PhysicalAVG_12_0               0.0113076923
## l2Siglec6_12_0                       0.0113076923
## IL17sR_12_0                          0.0112943593
## l2HTRA2_12_0                         0.0112941176
## Myoglobin_12_0                       0.0112390244
## l2STX1a_12_0                         0.0112390244
## OPG_12_0                             0.0112173913
## l2Myostatin_12_0                     0.0112130623
## l2kallikrein13_12_0                  0.0112000000
## lIPAQ_TotalMETs_12_0                 0.0111692308
## l2FSH_12_0                           0.0111511387
## l2LY86_12_0                          0.0111391771
## IWQOL_Physical7_12_0                 0.0111219512
## TSH_12_0                             0.0111151184
## IL13_12_0                            0.0111000000
## l2AntithrombinIII_12_0               0.0110988142
## l2BSP_12_0                           0.0110980747
## l2SEM5A_12_0                         0.0110769231
## AntithrombinIII_12_0                 0.0110564784
## IWQOL_Sex1_12_0                      0.0110402477
## Siglec6_12_0                         0.0110376812
## Myeloperoxidase_12_0                 0.0110147870
## l2Carbonicanhydrase6_12_0            0.0109880952
```

```
## HPK                               0.0109674185
## l2Neurotrophin5_12_0               0.0109579832
## MMP17_12_0                         0.0109205454
## l2CathepsinS_12_0                  0.0109111111
## HSP70_12_0                         0.0109090909
## PDE9A_12_0                         0.0108888889
## GV_12_0                            0.0108888889
## HSP40_12_0                         0.0108387097
## CHK1_12_0                          0.0108051064
## DAPK2_12_0                         0.0108000000
## IMDH2_12_0                         0.0107892340
## IL6_12_0                           0.0107727273
## l2GX_12_0                          0.0107687406
## l2OX40Ligand_12_0                  0.0107675785
## l2FGF10_12_0                       0.0107675676
## IL1RAcP_12_0                       0.0107292070
## EGFRvIII_12_0                      0.0106777778
## SBP_Standing_2_LAST                0.0106666667
## PPAC_12_0                          0.0106666667
## MOZ_12_0                           0.0106562648
## EphrinA3_12_0                      0.0106430155
## NET1_12_0                          0.0106430155
## l2TNFsRII_12_0                     0.0106430155
## FDW                                0.0106116279
## VC                                 0.0106076190
## l2AflatoxinB1aldehydereductase_    0.0105808696
## l2PTHrP_12_0                       0.0105787546
## HIPK3_12_0                         0.0105600000
## IFNaA_12_0                         0.0105442875
## Galectin3_12_0                     0.0105000000
## l2GDF11_12_0                       0.0105000000
## IL20Ra_12_0                        0.0104347826
## l2IL17RD_12_0                      0.0104347826
## SMAD2_12_0                         0.0104116743
## Notch1_12_0                        0.0104034537
## NCAML1_12_0                        0.0103879173
## l2AnnexinV_12_0                    0.0103434343
## CNTFRalpha_12_0                    0.0103404255
## CD27_12_0                          0.0103383493
## Grobg_12_0                         0.0103030303
## IPAQ_TotalMETs_Trun_12_0           0.0102857143
## l2sRAGE_12_0                       0.0102588235
## EphrinA5_12_0                      0.0102466793
## TANITAImpedance_LAST               0.0102108262
## l2CNTFRalpha_12_0                  0.0102023810
## sICAM1_12_0                        0.0101981800
## STAT6_12_0                         0.0101939394
## pc32                               0.0101818182
## l2CRIS3_12_0                       0.0101818182
## l2NANOG_12_0                       0.0101587302
## l2GOH                              0.0101230769
## l2MP2K2_12_0                       0.0100979021
## l2CKBB_12_0                        0.0100842883
## l2S100A4_12_0                      0.0100116959
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## l2HIF1a_12_0                     0.0100030189
## BEP                              0.0100000000
## PRL_12_0                         0.0100000000
## SUMO3_12_0                       0.0100000000
## l2C5a_12_0                       0.0100000000
## ALCAM_12_0                       0.0099820282
## l2FGFR3_12_0                     0.0099820282
## CATC_12_0                        0.0099654631
## Latency                         0.0099264706
## excursions_over_250_12_0         0.0099253904
## TLR2_12_0                        0.0099183673
## l2XEDAR_12_0                     0.0098823529
## ADAMTS5_12_0                     0.0098742857
## CollectinKidney1_12_0            0.0098742857
## Ku70_12_0                        0.0098000000
## RNF43_12_0                       0.0097500000
## lbgi_12_0                        0.0097123746
## RANTES_12_0                      0.0097067745
## l2Chitotriosidase1_12_0          0.0097067745
## IGFIsR_12_0                      0.0096474164
## l2BTC_12_0                       0.0096428571
## l2IR_12_0                        0.0096363636
## l2CSF1_12_0                      0.0096358543
## Axis2AverageCounts_12_0          0.0096252723
## OtherDrugs_12_0                  0.0096000000
## l2HCE001796_12_0                 0.0096000000
## TANITAMetabolicAge_LAST          0.0095609756
## IGFBP5_12_0                      0.0095511628
## ETHE1_12_0                       0.0095511628
## Cofilin1_12_0                    0.0095277778
## l2PECAM1_12_0                    0.0095238095
## d_hr120                          0.0095030303
## RAC3_12_0                        0.0094173913
## GAS1_12_0                        0.0094173913
## l2HAI1_12_0                      0.0093653817
## l2Adiponectin_12_0               0.0093454545
## wc3                              0.0092592593
## PH_12_0                          0.0092424242
## ABM                              0.0092222222
## l2CadherinE_12_0                 0.0091782946
## l2DCSIGNR_12_0                   0.0091443223
## Nectinlikeprotein1_12_0          0.0091000000
## PTK6_12_0                        0.0090476190
## ProlactinReceptor_12_0           0.0090076596
## Axis3CPM_12_0                    0.0090000000
## l2BQB                            0.0089824561
## Fibro_CAP_IQR_12_0               0.0089577791
## excursions_over_120_12_0         0.0088888889
## Mcl1_12_0                        0.0088149688
## CSH_12_0                         0.0087739096
## ZB                               0.0087651515
## DBP_Sitting_2_screening          0.0087272727
## BMPER_12_0                       0.0087272727
## l2CD109_12_0                     0.0087000000
```

```
## l2SDF1_12_0                          0.0086107843
## d_ltrig120                           0.0085714286
## l2Plasmin_12_0                       0.0085115152
## l2STAT6_12_0                         0.0084521739
## TANITAImpedance_screening            0.0084000000
## totalcounts                         0.0084000000
## AnnexinV_12_0                        0.0084000000
## l2FN14_12_0                          0.0084000000
## IL17BR_12_0                          0.0083809524
## MCP1_12_0                            0.0083076923
## ECM1_12_0                            0.0082377066
## FGF23_12_0                           0.0082173913
## l2iC3b_12_0                          0.0082173913
## l2IL10Rb_12_0                        0.0081219512
## Marapsin_12_0                        0.0080000000
## l2Glucocorticoidreceptor_12_0        0.0080000000
## l2HBEGF_12_0                         0.0078750000
## ENQ                                  0.0078545455
## Calcineurin_12_0                     0.0078277778
## Artemin_12_0                         0.0078166667
## Chk2_12_0                            0.0078134605
## RANK_12_0                            0.0078123295
## TYK2_12_0                            0.0078024390
## IL3_12_0                             0.0077943309
## VCAM1_12_0                           0.0077894737
## FGF5_12_0                            0.0077800587
## MaxTimeperFreedson1998Bou            0.0077575758
## BasophilAuto_12_0                    0.0077482270
## l2PYY_12_0                           0.0077313211
## Takeaway_PerWeek                     0.0076800000
## l2MCP4_12_0                          0.0076753388
## l2ENQ                               0.0076734694
## Midkine_12_0                         0.0076734694
## sLeptinR_12_0                        0.0076595745
## TBP_12_0                             0.0076521739
## CD23_12_0                            0.0076521739
## CAMK1_12_0                           0.0076518519
## Thymidinekinase_12_0                 0.0076436649
## HR_Sitting_1_LAST                    0.0076363636
## l2FCV                               0.0076363636
## TNR4_12_0                            0.0076279070
## l2a1Antitrypsin_12_0                 0.0076279070
## Tropomyosin2_12_0                    0.0076209314
## PIGR_12_0                            0.0076190476
## PIM1_12_0                            0.0076190476
## ENA78_12_0                           0.0076097561
## Carbonicanhydrase6_12_0              0.0076097561
## l2STAB2_12_0                         0.0076097561
## l2TBP_12_0                           0.0076044929
## l2HPVE7Type18_12_0                   0.0076000000
## l2Siglec9_12_0                       0.0076000000
## l2ABL1_12_0                          0.0075814536
## IL12_12_0                            0.0075789474
## l2ULBP2_12_0                         0.0075490196
```

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## FN13_12_0                             0.0075326689
## ALT_12_0                              0.0075294118
## Survivin_12_0                         0.0075188406
## MBD4_12_0                             0.0075151515
## PDGFRb_12_0                           0.0075000000
## CBPE_12_0                             0.0075000000
## dipaqsittingtrunc120                  0.0074858698
## SPINT2_12_0                           0.0074838710
## PDE3A_12_0                            0.0074838710
## l2MIP5_12_0                           0.0074785300
## l2CD59_12_0                           0.0074722222
## pc21                                  0.0074482759
## INGR2_12_0                            0.0074285714
## l2LBP_12_0                            0.0074209262
## Phosphoglyceratemutase1_12_0          0.0074074074
## l2IL2sRa_12_0                         0.0074074074
## CTGF_12_0                             0.0074068100
## GPC5_12_0                             0.0073991861
## Fasligandsoluble_12_0                 0.0073914824
## Ubiquitin_12_0                        0.0073846154
## l2LRIG3_12_0                          0.0073846154
## l2CLF1CLCComplex_12_0                 0.0073757503
## PDK1_12_0                             0.0073600000
## GCSFR_12_0                            0.0073504125
## ARTS1_12_0                            0.0073504125
## HCE004152_12_0                        0.0073369565
## CBX5_12_0                             0.0073369565
## ADJ                                   0.0073333333
## l2DSC2_12_0                           0.0073333333
## l2CSK_12_0                            0.0073333333
## l2complementfactorHrelated5_12_0      0.0073333333
## AflatoxinB1aldehydereductase_         0.0073310105
## l2HCE003300_12_0                      0.0073310105
## KininogenHMW_12_0                     0.0073204633
## VEGFsR3_12_0                          0.0073083004
## MIA_12_0                              0.0073083004
## ANGL4_12_0                            0.0073083004
## l2Carbonicanhydrase9_12_0             0.0073083004
## l2FABPL_12_0                          0.0072906404
## TIMP3_12_0                            0.0072857143
## PACAP27_12_0                          0.0072770563
## l2Lymphotoxina2b1_12_0                0.0072770563
## KX                                    0.0072727273
## Transketolase_12_0                    0.0072727273
## l2Flt3ligand_12_0                     0.0072727273
## l2Macrophagescavengerreceptor_12_0    0.0072727273
## ERBB2_12_0                            0.0072603517
## BSSP4_12_0                            0.0072603517
## TGFbRII_12_0                          0.0072428571
## Eotaxin_12_0                          0.0072428571
## l2Thrombin_12_0                       0.0072428571
## SLIK1_12_0                            0.0072403101
## TANITAFFM_LAST                        0.0072380952
## BASI_12_0                             0.0072380952
```

```
## l2Angiopoietin4_12_0              0.0072285714
## HXK1_12_0                         0.0072245153
## C4b_12_0                          0.0072245153
## CD97_12_0                         0.0072245153
## l2FGF4_12_0                       0.0072173730
## Glucagon_12_0                     0.0072052632
## RS3_12_0                          0.0072052632
## l2ECM1_12_0                       0.0072052632
## ABL                              0.0072000000
## TroponinI_12_0                    0.0072000000
## sRANKL_12_0                       0.0071637427
## HCE003183_12_0                    0.0071428571
## IgE_12_0                          0.0071382504
## CYTF_12_0                         0.0071130435
## IFNgR1_12_0                       0.0071111111
## l2PCadherin_12_0                  0.0071069767
## AUK                              0.0071024390
## C2_12_0                           0.0070877005
## l2ENC                            0.0070750000
## SMOC1_12_0                        0.0070533333
## l2DNG                            0.0070283401
## l2PlGF_12_0                       0.0070144928
## transcriptionfactorMLR1isofo      0.0070103343
## l2GML                            0.0070000000
## l2OSM_12_0                        0.0069938534
## MIF_12_0                          0.0069731868
## ABL1_12_0                         0.0069498708
## l2BTK_12_0                        0.0069428571
## l2EDAR_12_0                       0.0069333333
## IL19_12_0                         0.0069264069
## ATS1_12_0                         0.0069018718
## TLR4_12_0                         0.0068612403
## l2TGFbRIII_12_0                   0.0068571429
## Siglec9_12_0                      0.0068571429
## DcR3_12_0                         0.0068571429
## l2AMGO2_12_0                      0.0068571429
## TANITAIdealBodyWeight_screen      0.0068404558
## l2VEGFD_12_0                      0.0067969231
## DLL1_12_0                         0.0067914068
## avg_excur_over_140_per_day_12_0   0.0067820513
## percent_time_under_70_night_12_0  0.0067820513
## BDNF_12_0                         0.0067820513
## l2CAMK2A_12_0                     0.0067339130
## NumberofEpochs_12_0               0.0066818182
## l2GFRa3_12_0                      0.0066666667
## HSP70protein8_12_0                0.0066562771
## TCTP_12_0                         0.0066304762
## l2Cardiotrophin1_12_0             0.0066176471
## IWQOL_Physical6_12_0              0.0066149871
## STAT1_12_0                        0.0066149871
## CYTD_12_0                         0.0065666667
## ADAM9_12_0                        0.0065614035
## AveragelengthofSedentaryBrea      0.0065454545
## LCMT1_12_0                        0.0065379208
```

```
## lIPAQ_VigorousMETs_Trun_12_0        0.0064962406
## dipwalkingmetsg120                  0.0064000000
## SOST_12_0                           0.0064000000
## GranzymeH_12_0                       0.0064000000
## NAGK_12_0                            0.0064000000
## l2Artemin_12_0                       0.0064000000
## annexinVI_12_0                       0.0063333333
## lIPAQ_ModerateMETs_Trun_12_0         0.0063116883
## Peroxiredoxin6_12_0                  0.0062696296
## CLM6_12_0                            0.0062485353
## Angiopoietin4_12_0                   0.0062222222
## JAMC_12_0                            0.0062222222
## UFC1_12_0                            0.0062222222
## TS_12_0                              0.0062222222
## l2CTACK_12_0                         0.0062222222
## l2AIF1_12_0                          0.0062051282
## l2CalcineurinBa_12_0                 0.0062000000
## Duration_Month                       0.0060000000
## pc4                                  0.0060000000
## EQ5D_Mobility_12_0                   0.0060000000
## Macrophagescavengerreceptor_12_0     0.0060000000
## PSA6_12_0                            0.0060000000
## CYTT_12_0                            0.0060000000
## HIDH_12_0                            0.0060000000
## cIAP2_12_0                           0.0060000000
## HAO_12_0                             0.0060000000
## UBP25_12_0                           0.0060000000
## l2FactorI_12_0                       0.0060000000
## l2RSKlikeproteinkinase_12_0          0.0060000000
## l2ERBB2_12_0                         0.0058666667
## KI3S1_12_0                           0.0057887043
## ETU                                  0.0057142857
## CHKB_12_0                            0.0057142857
## EphrinA4_12_0                        0.0057142857
## IL17E_12_0                           0.0057142857
## Cytidylatekinase_12_0                0.0057142857
## KI3L2_12_0                           0.0057142857
## PPIE_12_0                            0.0057142857
## l2ISLR2_12_0                         0.0057142857
## l2SHP2_12_0                          0.0057142857
## PAK7_12_0                            0.0056666667
## l2SLIK1_12_0                         0.0056000000
## DPK                                  0.0053333333
## QORL1_12_0                           0.0053333333
## l2ULBP3_12_0                         0.0053333333
## l2IL20_12_0                          0.0053333333
## Peroxiredoxin1_12_0                  0.0052424242
## IDS_12_0                             0.0051428571
## d_ldl120                             0.0050066667
## PlGF_12_0                            0.0049855072
## WISP3_12_0                           0.0049855072
## min_spent_over_140_12_0              0.0049777778
## l2FQB                                0.0049696970
## Lymphotoxina2b1_12_0                 0.0049696970
```

```
## GNS_12_0                              0.0049696970
## CarbonicanhydraseI_12_0               0.0048761905
## MMP2_12_0                             0.0048333333
## l2GranzymeB_12_0                      0.0048000000
## l2LKHA4_12_0                          0.0047659479
## l2bFGF_12_0                           0.0047619048
## TANITABoneMass_LAST                   0.0047407407
## l2DQS                                 0.0047086957
## l2IL17E_12_0                          0.0046855960
## PDL2_12_0                             0.0046582850
## TNFsRI_12_0                           0.0046507177
## TECK_12_0                             0.0046197360
## PIAS4_12_0                            0.0046153846
## CD38_12_0                             0.0045961240
## EPI_12_0                              0.0045414414
## l2IL17B_12_0                          0.0045333333
## l2CaMKKalpha_12_0                     0.0042458002
## l2FETUB_12_0                          0.0040427783
## CathepsinS_12_0                       0.0039215686
## FCRL3_12_0                            0.0039215686
## l2YKL40_12_0                          0.0039200000
## ER_12_0                               0.0039183673
## AMNLS_12_0                            0.0039183673
## BQB                                   0.0039166667
## EQ5D_Pain_12_0                        0.0039166667
## STAB2_12_0                            0.0039148936
## l2TMA_12_0                            0.0039148936
## l2BPI_12_0                            0.0039148936
## min_spent_over_250_12_0               0.0039130435
## NSF1C_12_0                            0.0039130435
## dipaqtottrunc120                      0.0039111111
## l2GRB2relatedadapterprotein2_1        0.0039111111
## pTEN_12_0                             0.0039111111
## ADAM12_12_0                           0.0039111111
## MICB_12_0                             0.0039111111
## calreticulin_12_0                     0.0039111111
## LEG9_12_0                             0.0039111111
## l2EphrinA2_12_0                       0.0039111111
## l2HCE000414_12_0                      0.0039111111
## l2TGFb1_12_0                          0.0039111111
## IPAQ_TotalMETs_12_0                   0.0039090909
## Galectin4_12_0                        0.0039090909
## FYN_12_0                              0.0039090909
## GSTA3_12_0                            0.0039090909
## l2TLR4_12_0                           0.0039090909
## l2CYTF_12_0                           0.0039090909
## l2CarbonicanhydraseVII_12_0           0.0039090909
## l2FYN_12_0                            0.0039090909
## CoagulationFactorXa_12_0              0.0039069767
## CD48_12_0                             0.0039069767
## CoagulationFactorIX_12_0              0.0039069767
## SEPR_12_0                             0.0039069767
## l2UCRP_12_0                           0.0039069767
## l2TACI_12_0                           0.0039069767
```

```
## l2Siglec7_12_0                    0.0039069767
## l2IL19_12_0                       0.0039069767
## MSPR_12_0                         0.0039047619
## CathepsinB_12_0                   0.0039047619
## hnRNPK_12_0                       0.0039047619
## NCK1_12_0                         0.0039047619
## Tropomyosin1alphachain_12_0       0.0039047619
## l2BMP1_12_0                       0.0039047619
## l2HFJ                            0.0039024390
## IWQOL_TotalScale_12_0             0.0039024390
## M2PK_12_0                         0.0039024390
## CDON_12_0                         0.0039024390
## NXPH1_12_0                        0.0039024390
## l2IgE_12_0                        0.0039024390
## SBP_Sitting_1_LAST                0.0039000000
## FEW                              0.0039000000
## IWQOL_Distress4_12_0              0.0039000000
## Neurotrophin5_12_0                0.0039000000
## min_spent_over_180_day_12_0       0.0038974359
## LRIG3_12_0                        0.0038974359
## PGRPS_12_0                        0.0038974359
## l2Lumican_12_0                    0.0038974359
## l2ApoB_12_0                       0.0038974359
## l2JDO                            0.0038947368
## CRP_12_0                          0.0038947368
## JAK2_12_0                         0.0038947368
## NLGNX_12_0                        0.0038947368
## l2ATS13_12_0                      0.0038947368
## l2Aggrecan_12_0                   0.0038947368
## l2a2Macroglobulin_12_0            0.0038947368
## l2pTEN_12_0                       0.0038947368
## IFN10_12_0                        0.0038918919
## NogoReceptor_12_0                 0.0038918919
## l2CKMB_12_0                       0.0038918919
## C5b6Complex_12_0                  0.0038888889
## SIRT2_12_0                        0.0038888889
## ApoE2_12_0                        0.0038888889
## lacr_12_0                         0.0038888889
## l2MAPK2_12_0                      0.0038888889
## l2Prekallikrein_12_0              0.0038888889
## STRATIFIN_12_0                    0.0038857143
## TRAILR1_12_0                      0.0038857143
## l2HER                            0.0038823529
## IWQOL_Physical10_12_0             0.0038823529
## HCE004359_12_0                    0.0038823529
## TSP2_12_0                         0.0038823529
## l2FLRT2_12_0                      0.0038823529
## l2GV_12_0                         0.0038823529
## Height_screening                  0.0038787879
## HADS_Depression7_12_0             0.0038787879
## l2ApoptosisregulatorBclW_12_0     0.0038787879
## CJQ                              0.0038709677
## CLC1B_12_0                        0.0038709677
## TNFa_12_0                         0.0038709677
```

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```
## HFA                           0.0038666667
## NRP1_12_0                      0.0038666667
## l2ICOS_12_0                    0.0038666667
## TANITAWeight_LAST_CERNER       0.0038620690
## Tpo_12_0                       0.0038620690
## l2PTK6_12_0                    0.0038620690
## PDGFRA_12_0                    0.0038571429
## Aggrecan_12_0                  0.0038571429
## CaMKKalpha_12_0                0.0038571429
## PSelectin_12_0                 0.0038571429
## Waistcircumference_screening   0.0038400000
## FCV                            0.0038400000
## CoagulationFactorX_12_0        0.0038400000
## IF4A3_12_0                     0.0038400000
## IL1sR9_12_0                    0.0038400000
## LBP_12_0                       0.0038333333
## ATS13_12_0                     0.0038333333
## PHI_12_0                       0.0038333333
## ANP_12_0                       0.0038333333
## dipaqsitting120                0.0038260870
## NKp30_12_0                     0.0038260870
## RAP_12_0                       0.0038260870
## EMR2_12_0                      0.0038260870
## NR1D1_12_0                     0.0038260870
## l2C9_12_0                      0.0038260870
## C5_12_0                        0.0038181818
## FGF10_12_0                     0.0038181818
## l2sICAM3_12_0                  0.0038181818
## l2HEF                          0.0038095238
## CD177_12_0                     0.0038095238
## CoagulationFactorXI_12_0       0.0038095238
## LSAMP_12_0                     0.0038095238
## BPI_12_0                       0.0038095238
## CSRP3_12_0                     0.0038095238
## l2Galectin3_12_0               0.0038095238
## l2OLR1_12_0                    0.0038095238
## SHBG_12_0                      0.0038000000
## calgranulinB_12_0              0.0038000000
## l2C5_12_0                      0.0038000000
## l2PARC_12_0                    0.0038000000
## l2Periostin_12_0               0.0038000000
## ASG                            0.0037894737
## AUA                            0.0037894737
## HLY                            0.0037894737
## IFNA7_12_0                     0.0037894737
## WFKN2_12_0                     0.0037894737
## l2NSE_12_0                     0.0037894737
## l2granzymeA_12_0               0.0037894737
## l2dopadecarboxylase_12_0       0.0037894737
## CyclinB1_12_0                  0.0037777778
## l2GMY                          0.0037750363
## Prekallikrein_12_0             0.0037707391
## ROR1_12_0                      0.0037662745
## UB2G2_12_0                     0.0037662745
```

```
## MPIF1_12_0                          0.0037647059
## FUT5_12_0                           0.0037647059
## CRTAM_12_0                          0.0037647059
## l2CyclophilinA_12_0                 0.0037647059
## IWQOL_Physical1_12_0                0.0037568027
## BCMA_12_0                           0.0037568027
## l2FCN2_12_0                         0.0037568027
## ICOS_12_0                           0.0037500000
## MBL_12_0                            0.0037500000
## SLAF7_12_0                          0.0037500000
## uPA_12_0                            0.0037465310
## annexinII_12_0                      0.0037465310
## LuxAverageCounts_12_0               0.0037353535
## daytime_auc_12_0                    0.0037353535
## PARC_12_0                           0.0037353535
## d_lvitd120                          0.0037333333
## l2GMZ                               0.0037333333
## dopadecarboxylase_12_0              0.0037333333
## PSME3_12_0                          0.0037333333
## HCE001796_12_0                      0.0037293869
## MMP13_12_0                          0.0037293869
## CathepsinH_12_0                     0.0037293869
## l2EPHA3_12_0                        0.0037231451
## l2C2_12_0                           0.0037166086
## l2HCK_12_0                          0.0037166086
## l2PSelectin_12_0                    0.0037142857
## MRCKB_12_0                          0.0037025641
## GP114_12_0                          0.0036950067
## Gastrinreleasingpeptide_12_0        0.0036950067
## l2IL12_12_0                         0.0036950067
## l2LYVE1_12_0                        0.0036923077
## EFNB2_12_0                          0.0036786787
## IR_12_0                             0.0036786787
## Fibrinogengchaindimer_12_0          0.0036666667
## FMP                                 0.0036605042
## CarbonicAnhydraseX_12_0             0.0036401515
## TANITAVisceralFatRating_scre        0.0036363636
## CLC4K_12_0                          0.0036363636
## CD244_12_0                          0.0036363636
## GDF11_12_0                          0.0036214178
## a1Antitrypsin_12_0                  0.0036065306
## l2EIX                               0.0036000000
## IL23R_12_0                          0.0036000000
## l2ITAC_12_0                         0.0036000000
## l2GDF118_12_0                       0.0035986395
## inSedentary_12_0                    0.0035818686
## FBLN3_12_0                          0.0035729469
## Cripto_12_0                         0.0035555556
## totalminbed                         0.0035539112
## l2CathepsinV_12_0                   0.0035266667
## CATF_12_0                           0.0035219512
## l2IL1F8_12_0                        0.0035072464
## NSE_12_0                            0.0035000000
## FCG2A_12_0                          0.0035000000
```

```
## VAV_12_0                         0.0035000000
## RS3A_12_0                        0.0035000000
## l2GFRa2_12_0                     0.0035000000
## l2AIP_12_0                       0.0035000000
## l2HIPK3_12_0                     0.0034979757
## IntegrinaVb5_12_0                0.0034861660
## cndp_diff_012                    0.0034850640
## SGTA_12_0                        0.0034650980
## C3d_12_0                         0.0034632035
## TANITAMuscleMass_screening       0.0034285714
## TotalMeds_12_0                   0.0034285714
## SMAD3_12_0                       0.0034285714
## Hemopexin_12_0                   0.0034285714
## CDC37_12_0                       0.0034285714
## LaminB1_12_0                     0.0034285714
## SCGFalpha_12_0                   0.0034285714
## Myokinasehuman_12_0              0.0034285714
## CPNE1_12_0                       0.0034285714
## Noggin_12_0                      0.0034285714
## l2LAG1_12_0                      0.0034285714
## l2LRP8_12_0                      0.0034285714
## l2HSP40_12_0                     0.0034285714
## l2Sortingnexin4_12_0            0.0034285714
## TSLPR_12_0                       0.0033600000
## TimeToEat_Lunch                  0.0033333333
## PROTOCOLFOLLOWED_ACTIVE          0.0033333333
## CJO                             0.0033333333
## IWQOL_Esteem6_12_0               0.0033333333
## Axis1MaxCounts_12_0              0.0033333333
## min_spent_under_70_12_0          0.0033333333
## min_spent_over_180_night_12_0    0.0033333333
## ApoL1_12_0                       0.0033333333
## S100A4_12_0                      0.0033333333
## ApoM_12_0                        0.0033333333
## GA7331protein_12_0               0.0033333333
## C3adesArg_12_0                   0.0033333333
## EphA1_12_0                       0.0033333333
## TARC_12_0                        0.0033333333
## Glypican3_12_0                   0.0033333333
## BMPR1A_12_0                      0.0033333333
## MCP3_12_0                        0.0033333333
## LAG3_12_0                        0.0033333333
## l2CathepsinG_12_0                0.0033333333
## l2ActivinA_12_0                  0.0033333333
## l2FGF9_12_0                      0.0033333333
## l2Myoglobin_12_0                 0.0033333333
## l2Trypsin_12_0                   0.0033333333
## l2FCGR1_12_0                     0.0033333333
## l2KPCT_12_0                      0.0033333333
## XD                              0.0032000000
## AverageLengthofSedentaryBout     0.0032000000
## CHM                             0.0032000000
## GMZ                             0.0032000000
## dsbp120                         0.0032000000
```

```
## l2IOA                                   0.0032000000
## IPAQ_4_12_0                             0.0032000000
## MMP9_12_0                               0.0032000000
## MCSFR_12_0                              0.0032000000
## ERBB1_12_0                              0.0032000000
## SOD_12_0                                0.0032000000
## Trypsin_12_0                            0.0032000000
## CathepsinA_12_0                         0.0032000000
## kallikrein5_12_0                        0.0032000000
## CD5L_12_0                               0.0032000000
## PRKACA_12_0                             0.0032000000
## EphB4_12_0                              0.0032000000
## LY86_12_0                               0.0032000000
## PLPP_12_0                               0.0032000000
## CTAPIII_12_0                            0.0032000000
## CD83_12_0                               0.0032000000
## Elastase_12_0                           0.0032000000
## Tropomyosin4_12_0                       0.0032000000
## BMP6_12_0                               0.0032000000
## l2BMP14_12_0                            0.0032000000
## l2HaptoglobinMixedType_12_0             0.0032000000
## l2ETHE1_12_0                            0.0032000000
## TimeToEat_Breakfast                     0.0030000000
## IPAQ_ModerateMETs_Trun_12_LOCF          0.0030000000
## l2GRV                                   0.0030000000
## percent_time_over_250_day_12_0          0.0030000000
## HCE004333_12_0                          0.0030000000
## FGF18_12_0                              0.0030000000
## BGN_12_0                                0.0030000000
## FCG3B_12_0                              0.0030000000
## LCK_12_0                                0.0030000000
## Adiponectin_12_0                        0.0030000000
## DLRB1_12_0                              0.0030000000
## sRAGE_12_0                              0.0030000000
## Eotaxin2_12_0                           0.0030000000
## IF4G2_12_0                              0.0030000000
## GDF2_12_0                               0.0030000000
## FAK1_12_0                               0.0030000000
## cGMPstimulatedPDE_12_0                  0.0030000000
## l2SMAD2_12_0                            0.0030000000
## l2Alphaenolase_12_0                     0.0030000000
## l2HO2_12_0                              0.0030000000
## l2Hemopexin_12_0                        0.0030000000
## l2Fibrinogen_12_0                       0.0030000000
## l2ActivinRIB_12_0                       0.0030000000
## l2CytochromeP4503A4_12_0                0.0030000000
## l2IL4sR_12_0                            0.0030000000
## l2CD39_12_0                             0.0030000000
## l2PAK7_12_0                             0.0030000000
## l2FN13_12_0                             0.0030000000
## l2BQC                                   0.0028190476
## EQ                                      0.0026666667
## SBP_Sitting_2_LAST                      0.0026666667
## FFR                                     0.0026666667
```

```
## IHP                                      0.0026666667
## l2EOY                                     0.0026666667
## HADS_Depression2_12_0                     0.0026666667
## HADS_Anxiety7_12_0                        0.0026666667
## FSTL1_12_0                                0.0026666667
## BMP14_12_0                                0.0026666667
## IL22_12_0                                 0.0026666667
## ART_12_0                                  0.0026666667
## Glutamatecarboxypeptidase_12_0           0.0026666667
## C1r_12_0                                  0.0026666667
## AIP_12_0                                  0.0026666667
## SBDS_12_0                                 0.0026666667
## SNAA_12_0                                 0.0026666667
## ZAP70_12_0                                0.0026666667
## betaHSD1_12_0                             0.0026666667
## Ddimer_12_0                               0.0026666667
## KI2L4_12_0                                0.0026666667
## Somatostatin28_12_0                       0.0026666667
## lIPAQ_VigorousMETs_12_0                   0.0026666667
## lIPAQ_WalkingMETs_Trun_12_0               0.0026666667
## l2B7_12_0                                 0.0026666667
## l2CalpainI_12_0                           0.0026666667
## l2Ubiquitin1_12_0                         0.0026666667
## l2Karyopherina2_12_0                      0.0026666667
## l2PCNA_12_0                               0.0026666667
## l2Galectin2_12_0                          0.0026666667
## l2Thrombospondin1_12_0                    0.0026666667
## l2PDGFCC_12_0                             0.0026666667
## l2SKP1_12_0                               0.0026666667
## BEU                                       0.0020000000
## l2BNX                                     0.0020000000
## l2CPZ                                     0.0020000000
## avg_excur_over_200_per_day_12_0           0.0020000000
## HMG1_12_0                                 0.0020000000
## GPC2_12_0                                 0.0020000000
## Chitotriosidase1_12_0                     0.0020000000
## l2CDK1cyclinB_12_0                        0.0020000000
## IL1sRI_12_0                               0.0019230769
## l2SOD_12_0                                0.0019111111
## ESM                                       0.0019090909
## PSME1_12_0                                0.0019024390
## l2EDA_12_0                                0.0019024390
## l2IL22_12_0                               0.0018947368
## l2IL18Rb_12_0                             0.0009166667
```

CART

Classification

```r
library(rpart)
library(rpart.plot)


fit1 <- rpart(remission~., method="class", data=data)
```

```
printcp(fit1)
```

```
##
## Classification tree:
## rpart(formula = remission ~ ., data = data, method = "class")
##
## Variables actually used in tree construction:
## [1] daytime_min_sensor_glucose_12_0 Folate_12_0
##
## Root node error: 27/70 = 0.38571
##
## n= 70
##
##          CP nsplit rel error  xerror     xstd
## 1 0.777778      0   1.00000 1.00000 0.150835
## 2 0.037037      1   0.22222 0.29630 0.098589
## 3 0.010000      2   0.18519 0.48148 0.120503
```

```
plotcp(fit1)
```

size of tree
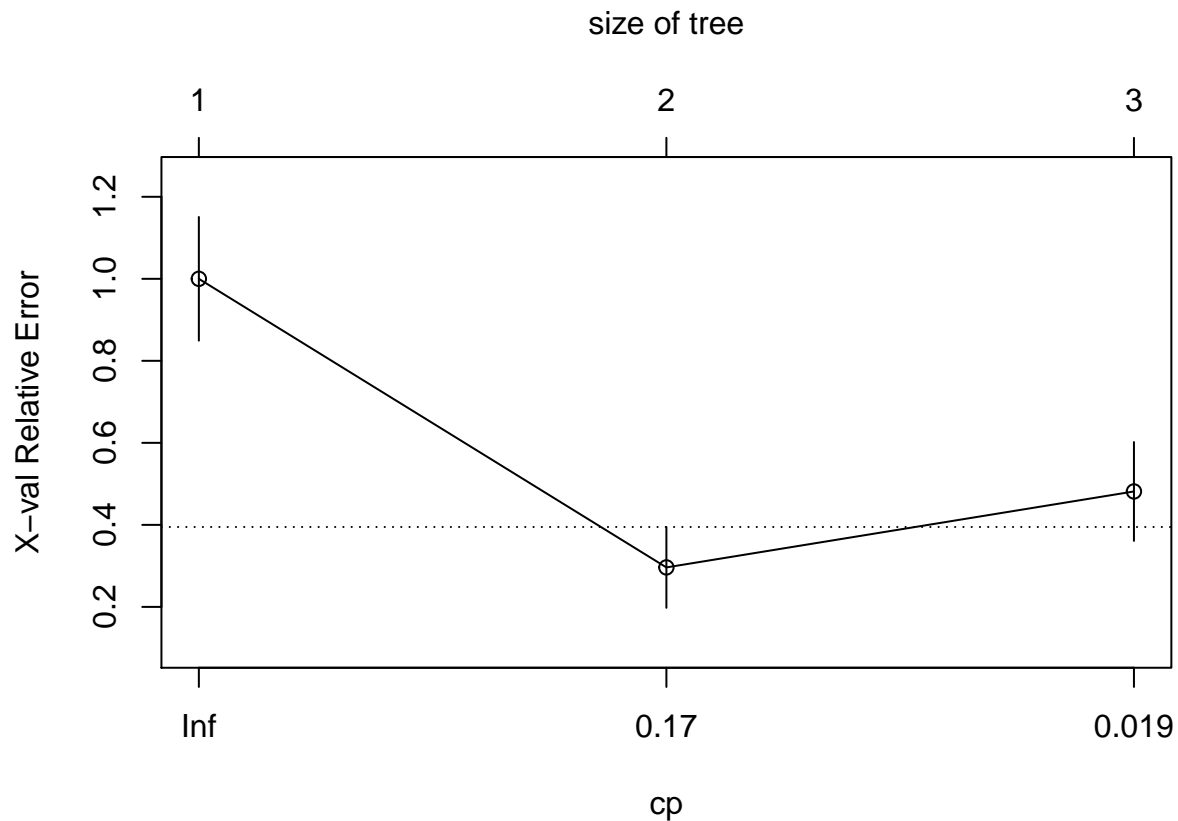

```
summary(fit1)
```

```
## Call:
## rpart(formula = remission ~ ., data = data, method = "class")
##   n= 70
##
##          CP nsplit rel error    xerror       xstd
```

```
## 1 0.77777778      0 1.0000000 1.0000000 0.15083542
## 2 0.03703704      1 0.2222222 0.2962963 0.09858891
## 3 0.01000000      2 0.1851852 0.4814815 0.12050257
##
## Variable importance
##                    Folate_12_0                        Albumin_12_0
##                             17                                  14
##                    Calcium_12_0                           lAST_12_0
##                             14                                  14
##                      lvitD_12_0                         QUICKI_12_0
##                             14                                  14
## daytime_min_sensor_glucose_12_0            estimated_a1c_12_0
##                              3                                   2
##                        gmi_12_0 nighttime_avg_sens_glucose_12_0
##                              2                                   2
##              average_sensor_12_0                   q1_sensor_12_0
##                              2                                   2
##
## Node number 1: 70 observations,    complexity param=0.7777778
##   predicted class=1  expected loss=0.3857143  P(node) =1
##     class counts:    27    43
##    probabilities: 0.386 0.614
##   left son=2 (21 obs) right son=3 (49 obs)
##   Primary splits:
##       Folate_12_0 < -7.3         to the left,  improve=22.64082, (0 missing)
##       lAST_12_0   < -1.191506    to the left,  improve=19.68123, (0 missing)
##       BEN         < 0.003126954 to the left,  improve=18.28681, (0 missing)
##       hbaf        < 2.4          to the left,  improve=18.28681, (0 missing)
##       Urea_12_0   < -2.6         to the left,  improve=18.28681, (0 missing)
##   Surrogate splits:
##       Calcium_12_0 < -2.235      to the left,  agree=0.943, adj=0.81, (0 split)
##       Albumin_12_0 < -37         to the left,  agree=0.943, adj=0.81, (0 split)
##       QUICKI_12_0  < -0.1013723  to the left,  agree=0.943, adj=0.81, (0 split)
##       lvitD_12_0   < -1.641707   to the left,  agree=0.943, adj=0.81, (0 split)
##       lAST_12_0    < -1.191506   to the left,  agree=0.943, adj=0.81, (0 split)
##
## Node number 2: 21 observations
##   predicted class=0  expected loss=0  P(node) =0.3
##     class counts:    21     0
##    probabilities: 1.000 0.000
##
## Node number 3: 49 observations,    complexity param=0.03703704
##   predicted class=1  expected loss=0.122449  P(node) =0.7
##     class counts:     6    43
##    probabilities: 0.122 0.878
##   left son=6 (9 obs) right son=7 (40 obs)
##   Primary splits:
##       daytime_min_sensor_glucose_12_0 < -70.5       to the left,  improve=4.136168, (0 missing)
##       Triglyceride_12_0               < -1.075      to the left,  improve=3.292517, (0 missing)
##       percent_time_70_180_night_12_0  < -20.91778   to the left,  improve=3.292517, (0 missing)
##       modd_12_0                       < -30.2217    to the left,  improve=3.292517, (0 missing)
##       SBP_Standing_Avg_LAST           < 111.75      to the left,  improve=3.128698, (0 missing)
##   Surrogate splits:
##       estimated_a1c_12_0              < -4.05       to the left,  agree=0.959, adj=0.778, (0 split)
```

30

```
##        gmi_12_0                           < -2.85       to the left,  agree=0.959, adj=0.778, (0 split)
##        nighttime_avg_sens_glucose_12_0 < -99.7621    to the left,  agree=0.959, adj=0.778, (0 split)
##        average_sensor_12_0               < -108.4068   to the left,  agree=0.939, adj=0.667, (0 split)
##        q1_sensor_12_0                    < -96         to the left,  agree=0.939, adj=0.667, (0 split)
##
## Node number 6: 9 observations
##   predicted class=0  expected loss=0.4444444  P(node) =0.1285714
##       class counts:     5     4
##     probabilities: 0.556 0.444
##
## Node number 7: 40 observations
##   predicted class=1  expected loss=0.025  P(node) =0.5714286
##       class counts:     1    39
##     probabilities: 0.025 0.975
```

```
{plot(fit1, uniform=TRUE, main="Classification Tree")
text(fit1, use.n=TRUE, xpd=TRUE, cex=.8)}
```

Classification Tree
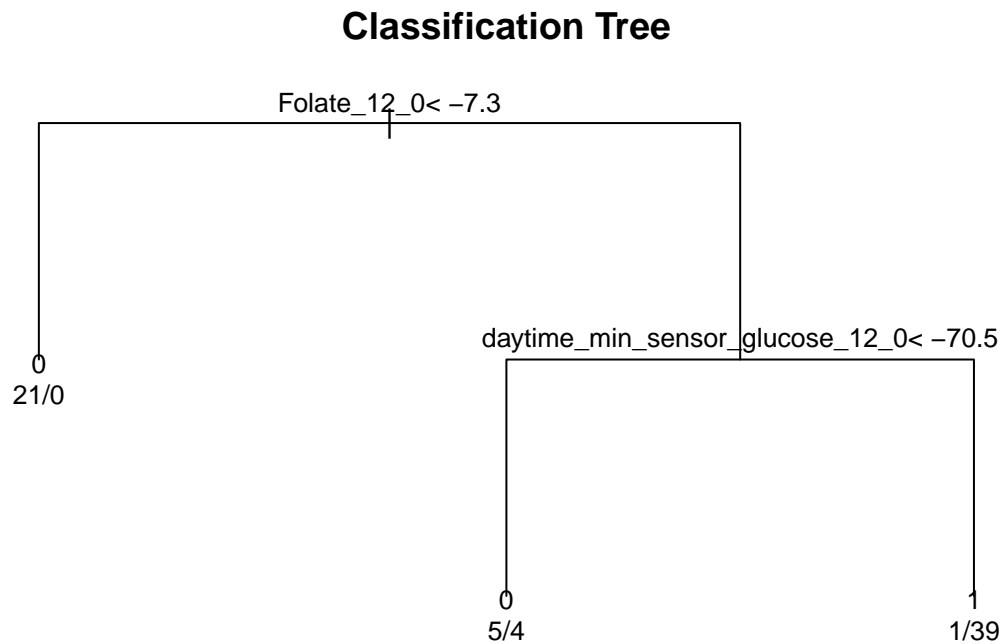

```
pfit<- prune(fit1, cp= fit1$cptable[which.min(fit1$cptable[,"xerror"]),"CP"])

# plot the pruned tree
{plot(pfit, uniform=TRUE, main="Pruned Classification Tree")
text(pfit, use.n=TRUE, xpd=TRUE, cex=.8)}
```

Pruned Classification Tree

Folate_12_0< −7.3

```
0          1
21/0       6/43
```
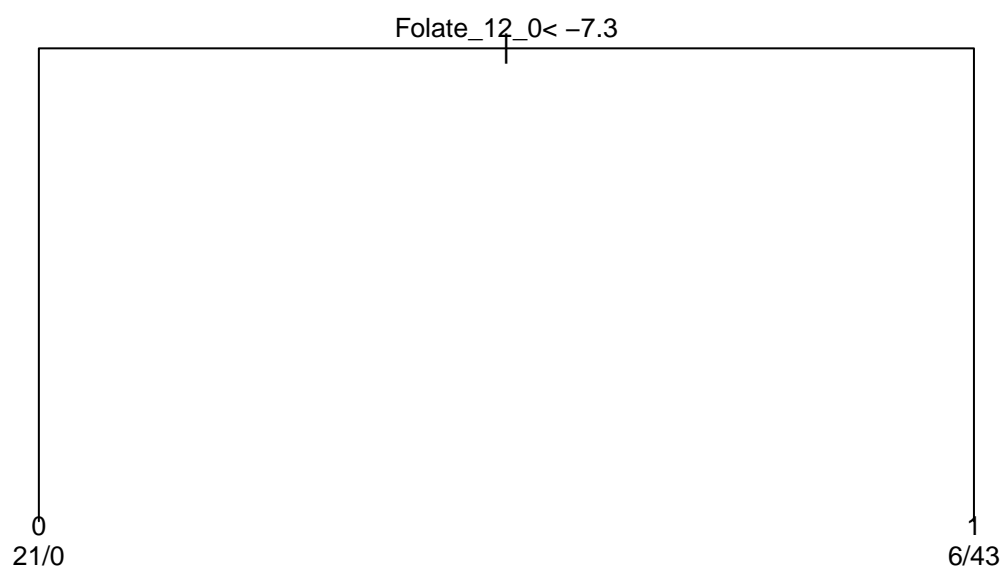
Regression

```r
fit <- rpart(remission~., method="anova", data=data)
```

```r
printcp(fit)
```

```
##
## Regression tree:
## rpart(formula = remission ~ ., data = data, method = "anova")
##
## Variables actually used in tree construction:
## [1] daytime_min_sensor_glucose_12_0 Folate_12_0
##
## Root node error: 16.586/70 = 0.23694
##
## n= 70
##
##         CP nsplit rel error  xerror     xstd
## 1 0.68254      0   1.00000  1.02849 0.058388
## 2 0.12469      1   0.31746  0.42950 0.129265
## 3 0.01000      2   0.19277  0.54472 0.142489
```

```r
plotcp(fit)
```

size of tree
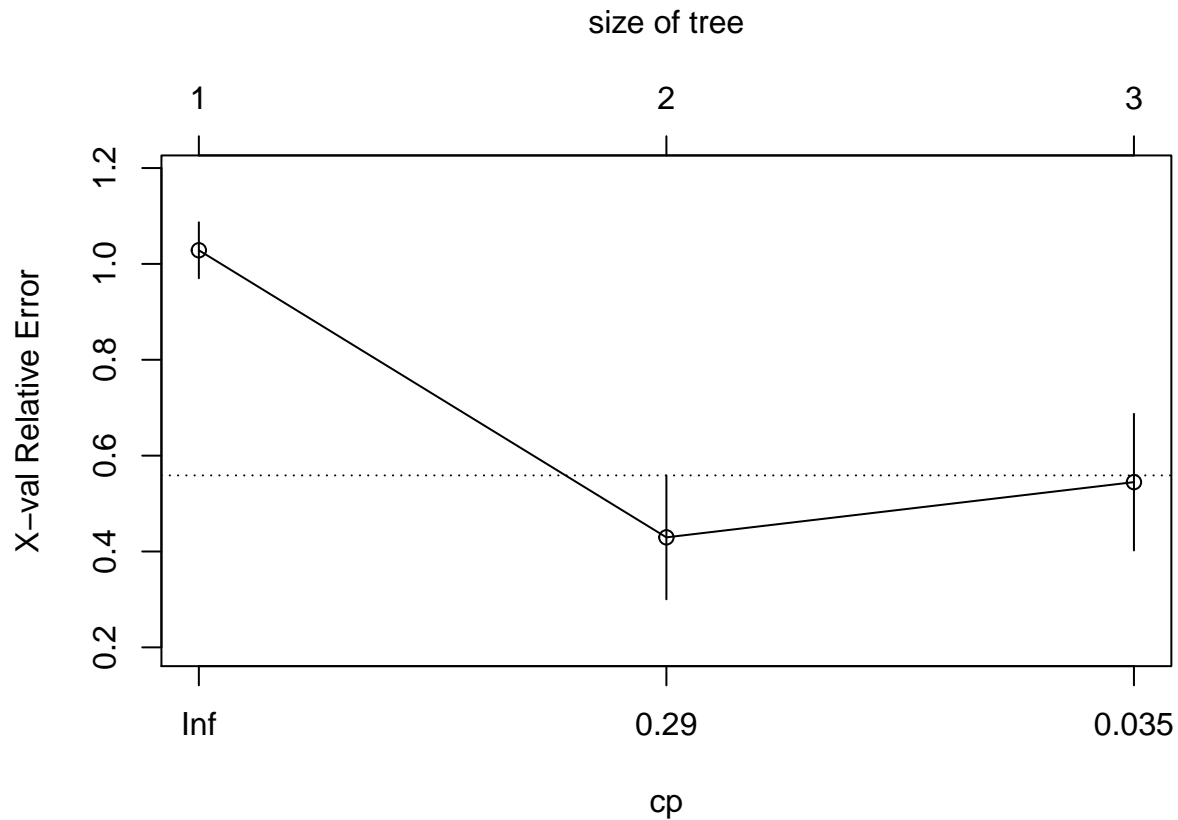

```r
summary(fit)
```

```
## Call:
## rpart(formula = remission ~ ., data = data, method = "anova")
##   n= 70
##
##          CP nsplit rel error    xerror      xstd
## 1 0.6825397      0 1.0000000 1.0284876 0.05838835
## 2 0.1246907      1 0.3174603 0.4295023 0.12926500
## 3 0.0100000      2 0.1927696 0.5447211 0.14248928
##
## Variable importance
##                 Folate_12_0                       Albumin_12_0
##                          17                                 14
##                Calcium_12_0                          lAST_12_0
##                          14                                 14
##                   lvitD_12_0                        QUICKI_12_0
##                          14                                 14
## daytime_min_sensor_glucose_12_0              estimated_a1c_12_0
##                           3                                  2
##                     gmi_12_0 nighttime_avg_sens_glucose_12_0
##                           2                                  2
##           average_sensor_12_0                    q1_sensor_12_0
##                           2                                  2
##
## Node number 1: 70 observations,    complexity param=0.6825397
```

```
##    mean=1.614286, MSE=0.2369388
##    left son=2 (21 obs) right son=3 (49 obs)
##    Primary splits:
##        Folate_12_0  < -7.3          to the left,  improve=0.6825397, (0 missing)
##        lAST_12_0    < -1.191506     to the left,  improve=0.5933188, (0 missing)
##        BEN          < 0.003126954 to the left,  improve=0.5512821, (0 missing)
##        hbaf         < 2.4          to the left,  improve=0.5512821, (0 missing)
##        Urea_12_0    < -2.6          to the left,  improve=0.5512821, (0 missing)
##    Surrogate splits:
##        Calcium_12_0 < -2.235        to the left,  agree=0.943, adj=0.81, (0 split)
##        Albumin_12_0 < -37           to the left,  agree=0.943, adj=0.81, (0 split)
##        QUICKI_12_0  < -0.1013723   to the left,  agree=0.943, adj=0.81, (0 split)
##        lvitD_12_0   < -1.641707    to the left,  agree=0.943, adj=0.81, (0 split)
##        lAST_12_0    < -1.191506    to the left,  agree=0.943, adj=0.81, (0 split)
##
## Node number 2: 21 observations
##    mean=1, MSE=0
##
## Node number 3: 49 observations,    complexity param=0.1246907
##    mean=1.877551, MSE=0.1074552
##    left son=6 (9 obs) right son=7 (40 obs)
##    Primary splits:
##        daytime_min_sensor_glucose_12_0 < -70.5       to the left,  improve=0.3927756, (0 missing)
##        Triglyceride_12_0               < -1.075      to the left,  improve=0.3126615, (0 missing)
##        percent_time_70_180_night_12_0  < -20.91778   to the left,  improve=0.3126615, (0 missing)
##        modd_12_0                       < -30.2217    to the left,  improve=0.3126615, (0 missing)
##        estimated_a1c_12_0              < -3.25       to the left,  improve=0.2971051, (0 missing)
##    Surrogate splits:
##        estimated_a1c_12_0              < -4.05       to the left,  agree=0.959, adj=0.778, (0 split)
##        gmi_12_0                        < -2.85       to the left,  agree=0.959, adj=0.778, (0 split)
##        nighttime_avg_sens_glucose_12_0 < -99.7621    to the left,  agree=0.959, adj=0.778, (0 split)
##        average_sensor_12_0             < -108.4068   to the left,  agree=0.939, adj=0.667, (0 split)
##        q1_sensor_12_0                  < -96         to the left,  agree=0.939, adj=0.667, (0 split)
##
## Node number 6: 9 observations
##    mean=1.444444, MSE=0.2469136
##
## Node number 7: 40 observations
##    mean=1.975, MSE=0.024375
```

```r
par(mfrow=c(1,2))
rsq.rpart(fit)
```

```
##
## Regression tree:
## rpart(formula = remission ~ ., data = data, method = "anova")
##
## Variables actually used in tree construction:
## [1] daytime_min_sensor_glucose_12_0 Folate_12_0
##
## Root node error: 16.586/70 = 0.23694
##
## n= 70
##
##        CP nsplit rel error  xerror     xstd
```

```
## 1 0.68254       0    1.00000 1.02849 0.058388
## 2 0.12469       1    0.31746 0.42950 0.129265
## 3 0.01000       2    0.19277 0.54472 0.142489
```
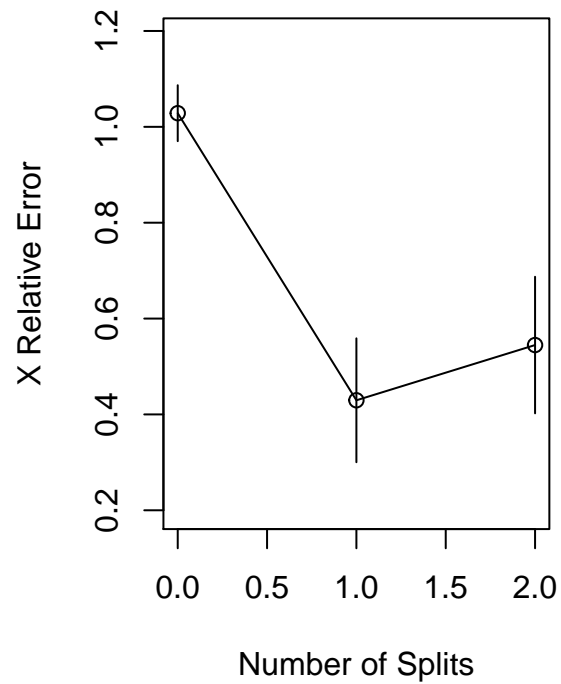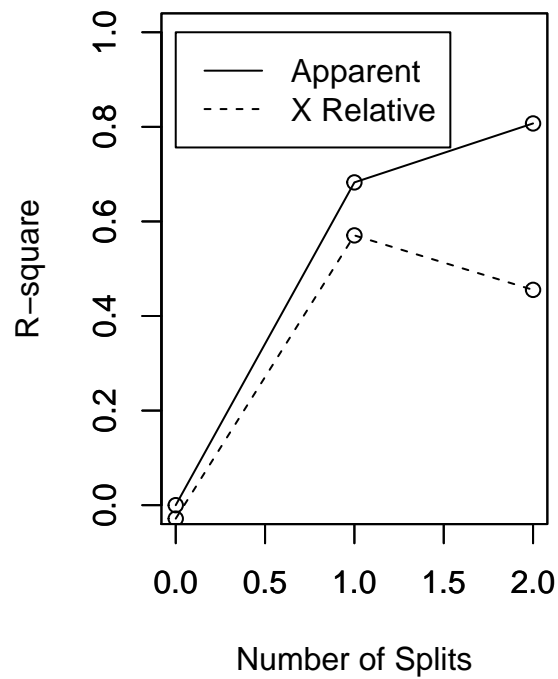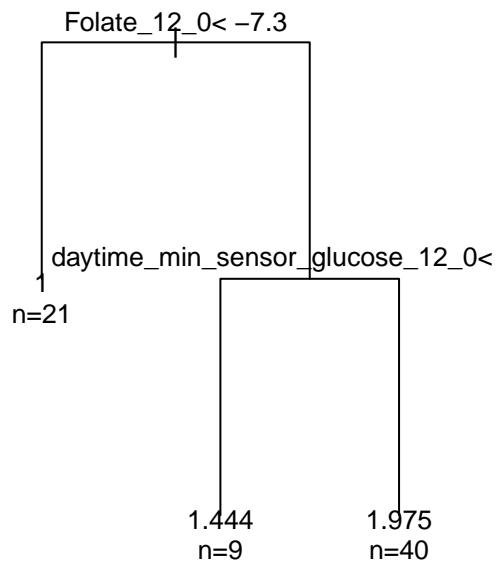


```
{plot(fit, uniform=TRUE, main="Regression Tree")
text(fit, use.n=TRUE, xpd=TRUE, cex=.8)}

pfit<- prune(fit, cp= fit1$cptable[which.min(fit1$cptable[,"xerror"]),"CP"])

# plot the pruned tree
{plot(pfit, uniform=TRUE, main="Pruned Regression Tree")
text(pfit, use.n=TRUE, xpd=TRUE, cex=.8)}
```
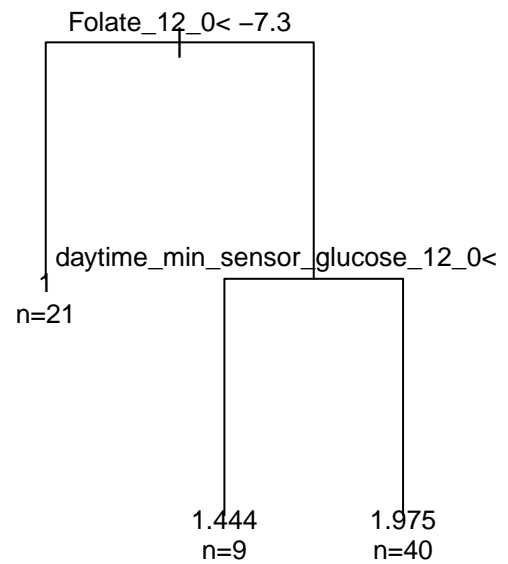
Regression Tree

Folate_12_0< −7.3

1
n=21

daytime_min_sensor_glucose_12_0<

1.444
n=9

1.975
n=40

Pruned Regression Tree

Folate_12_0< −7.3

1
n=21

daytime_min_sensor_glucose_12_0<

1.444
n=9

1.975
n=40

Multiple Linear Regression

```
fit<- lm(remission~., data=data)
```

```
## Warning in model.response(mf, "numeric"): using type = "numeric" with a factor
## response will be ignored
```

```
## Warning in Ops.factor(y, z$residuals): '-' not meaningful for factors
```

```
summ<-summary(fit)
```

```
## Warning in Ops.factor(r, 2): '^' not meaningful for factors
```

```
#summ
coeffs<-coefficients(fit)
coeffsord <- coeffs[order(-coeffs)]
#coeffsord
coeffsord<-na.omit(coeffsord)
data.frame(coeffsord)
```

```
##                               coeffsord
## (Intercept)                 2.483200e+02
## Mother_Cancer               4.740726e+00
## Father_Cancer               4.341466e+00
## TANITAFFM_screening         4.329283e+00
## ExSmoker                    4.159041e+00
## TANITAWeight_screening      3.295370e+00
## TANITABMR_screening         3.042602e+00
```

```
## Father_Diabetes                   1.872362e+00
## CurrentSmoker_Shisha              1.251051e+00
## SBP_Standing_Avg_screening        7.967440e-01
## Father_Obesity                    4.323048e-01
## HR_Sitting_2_screening            4.008988e-01
## Takeaway_PerWeek                  3.322471e-01
## Dates_Quantity                    3.134188e-01
## SBP_Sitting_2_screening           2.922432e-01
## Mother_CVD                        2.863922e-01
## Soda_PerWeek                      2.333353e-01
## PhysicianDuration_121             2.293297e-01
## DBP_Sitting_1_screening           1.932015e-01
## DBP_Standing_1_screening          1.247072e-01
## DBP_Sitting_2_screening           1.048951e-01
## LatestAlbCr                       9.593252e-02
## TANITATBW_screening               9.325901e-02
## HR_Standing_1_screening           7.934664e-02
## TANITAImpedance_screening         6.086061e-02
## SBP_Sitting_1_screening           6.018763e-02
## DieticianDuration_121             5.170409e-02
## TimeToEat_Breakfast               5.156961e-02
## Mother_Obesity                    3.992159e-02
## Coffee_PerWeek                    3.549674e-02
## Hipcircumference_screening        3.006949e-02
## Neckcircumference_screening       3.560605e-03
## TrainerDuration_121               1.439771e-03
## OO                                4.338848e-04
## KX                               -2.430382e-04
## Waistcircumference_screening     -7.510443e-04
## HG                               -1.123688e-03
## RD                               -1.561101e-03
## HR_Sitting_1_screening           -5.399085e-03
## EQ                               -7.188664e-03
## UZ                               -1.200850e-02
## TimeToEat_Lunch                  -1.457020e-02
## TimeToEat_Dinner                 -3.674659e-02
## Tea_PerWeek                      -9.962502e-02
## TANITAMetabolicAge_screening     -1.128635e-01
## DBP_Standing_2_screening         -1.478293e-01
## Juice_PerWeek                    -1.667087e-01
## HR_Standing_2_screening          -1.807813e-01
## Dates_PerWeek                    -1.916388e-01
## Father_CVD                       -2.009244e-01
## SBP_Standing_2_screening         -2.104589e-01
## DBP_Sitting_Avg_screening        -3.045556e-01
## VA                               -3.353568e-01
## TANITAVisceralFatRating_scre     -3.694895e-01
## SBP_Sitting_Avg_screening        -3.723838e-01
## HR_Sitting_Avg_screening         -3.753063e-01
## Mother_Hypertension              -4.488260e-01
## SBP_Standing_1_screening         -4.796831e-01
## WX                               -4.820194e-01
## NeutrophilAutoAbsoluteNeu        -5.718729e-01
## TANITAFatMass_screening          -9.192848e-01
```

```
## VC                          -1.087770e+00
## Height_screening            -1.132343e+00
## Father_Hypertension         -1.386737e+00
## CurrentSmoker_Cigarettes    -1.603185e+00
## TANITAMuscleMass_screening  -1.658964e+00
## TANITAIdealBodyWeight_screen -1.862862e+00
## Mother_Diabetes             -2.652432e+00
## TANITABMI_screening         -4.902927e+00
## BK                          -1.285434e+01
```