Stroke Documentation using LaTeX

Pouria Mojabi, mojabi@genophen.com

July 7, 2011

0.1 Introduction

This Documentation is intended for Strok Disease. all the risk factors that are associated with Stroke are identified and assesed. From genitics to your daily routines. Calculations are primarily based on two sources. CDC(NHANES) dataset and scientific papers. Some risk factors are extracted from CDC and some are extracted from the papers. Below you will find details about each risk factor. risk Factors from NHANES dataset can all be found under CDC section. references can be found at the end of the document

0.2 Diabetes

Diabetes is a categorical variable with binary state. Either yes or no wheter you have it or not

Diabetes	OR	CI
No	1	ref
Yes	2.78	2.13-3.61

Values of this table are from **(author?)** [4] paper.

0.3 Blood Pressure

After consulting with Dr.Malek we decide to implement **(author?)** [2]. **Note that population is Asian only**. on the website we should present this with a disclaimer.

Category	Optimal	Normal	HighNormal	HypertensionI	HypertensionII	HypertensionIII
SBP	<120	120-129	130-139	140-159	160-179	>180
OR	1	1.43	1.81	2.82	3.91	6.58
CI	1.16-1.76	1.47-2.23	2.31-3.41	3.09-4.95	4.96-8.73	

Category	Optimal	Normal	HighNormal	HypertensionI	HypertensionII	HypertensionIII
DBP	<80	80-84	85-89	90-99	100-109	>110
OR	1	1.43	1.81	2.82	3.91	6.58
CI	1.16-1.76	1.47-2.23	2.31-3.41	3.09-4.95	4.96-8.73	

Normal range is considered baseline and optimal range gives a protective effect Les see some graphs!

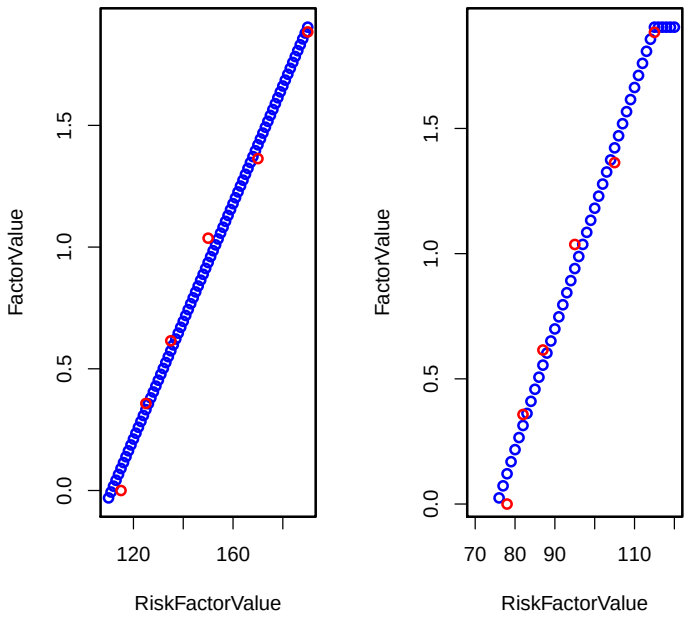

Figure 1: OR vs BP

0.4 SleepCondition

Not getting proper sleep can increase the probability of getting a Stroke. Odds ratios are taken from [1]

SleepCondition	OR	CI
Sleep Apnea	2.89	1.3-6.09
Sleep Disorder	2.89	1.37-6.09

0.5 Past CVD Condition

This considered your family history. ORs are extracted from [3] and Shoshana Reshef (couldn't find this, check with sadaf)

PastCVD	OR	CI
Atrail Fibrilation	2.86	1.25-6.58
Myocardial Infaction	2.09	1.23-3.55
HeartFailure and Stroke	2.2	1.5-3.4

0.6 CDC

Some risk factors are calculated using NHANES dataset. Logistic regression is performed and odds ratios are calculated. we will briefly mention the model below. Y-axis of all the Plots is log scale(log of odds ratio)

```
Call:
glm(formula = CVD ~ BMIC2 + Age + Gender + WaistAdBMI2 + Race,
    family = binomial, data = Data1)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-0.7320  -0.2955  -0.1613  -0.0837   3.8650

Coefficients:
              Estimate Std. Error z value Pr(>|z|)
(Intercept)  -9.252646   0.777788 -11.896  < 2e-16 ***
BMIC2         0.064821   0.011524   5.625 1.85e-08 ***
Age3          1.883263   0.759363   2.480  0.01314 *
Age4          2.720815   0.726350   3.746  0.00018 ***
Age5          3.495981   0.719462   4.859 1.18e-06 ***
Age6          4.099682   0.713808   5.743 9.28e-09 ***
Age7          4.473912   0.713955   6.266 3.70e-10 ***
Age8          5.147710   0.712539   7.224 5.03e-13 ***
GenderM      -0.075031   0.103354  -0.726  0.46786
WaistAdBMI2   0.019773   0.007346   2.692  0.00711 **
Race2Hisp     0.010918   0.118142   0.092  0.92637
Race3NHBlack  0.441559   0.112831   3.913 9.10e-05 ***
Race4Other    0.330240   0.252858   1.306  0.19154
---
Signif. codes:  0 âĂŸ***âĂŹ 0.001 âĂŸ**âĂŹ 0.01 âĂŸ*âĂŹ 0.05 âĂŸ.âĂŹ 0.1 âĂŸ âĂŹ 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 5077.3  on 18866  degrees of freedom
Residual deviance: 4381.9  on 18854  degrees of freedom
AIC: 4407.9

Number of Fisher Scoring iterations: 9
```

Lets take a look at our Base Model

```
> layout(matrix(c(1, 2, 3, 4), 2, 2))
> plot(Mbase)
```

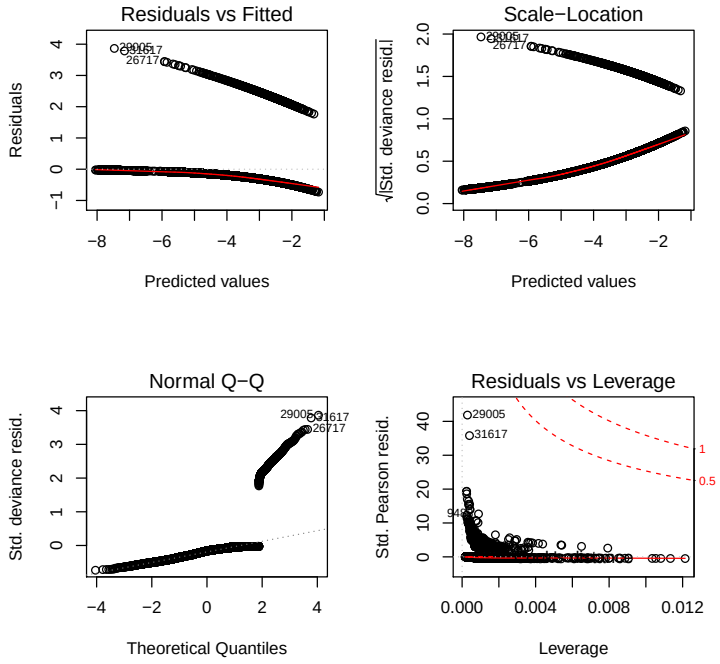

Figure 2: Logistic Regression

0.6.1 BMI

BMI is calculated directly from CDC dataset;

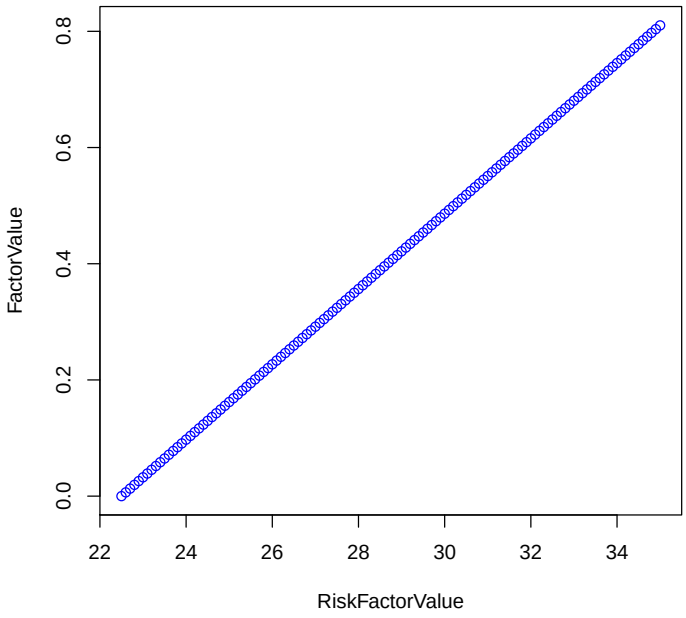

Figure 3: OR ratio vs BMI

0.6.2 Age

Age (a categorical variable in this case) can directly get caluclated from the base model

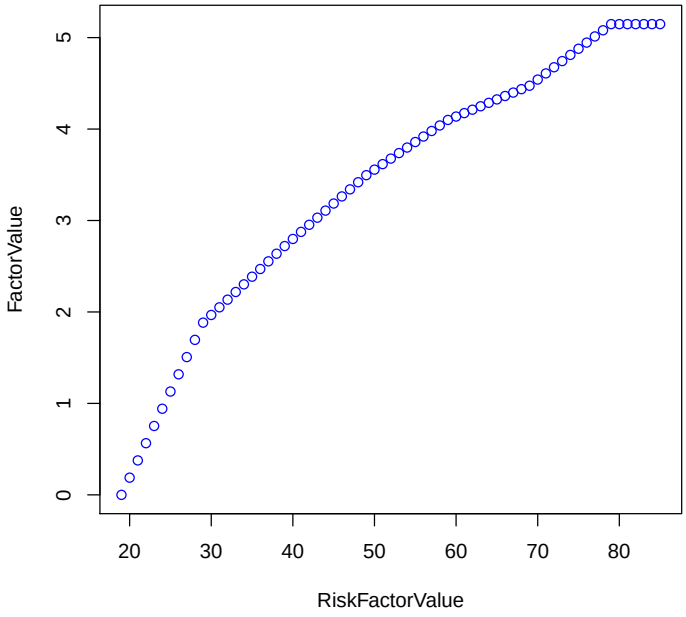

Figure 4: OR vs Age

0.6.3 Gender

Gender is also a categorical variable. either Male or Female can't be both!

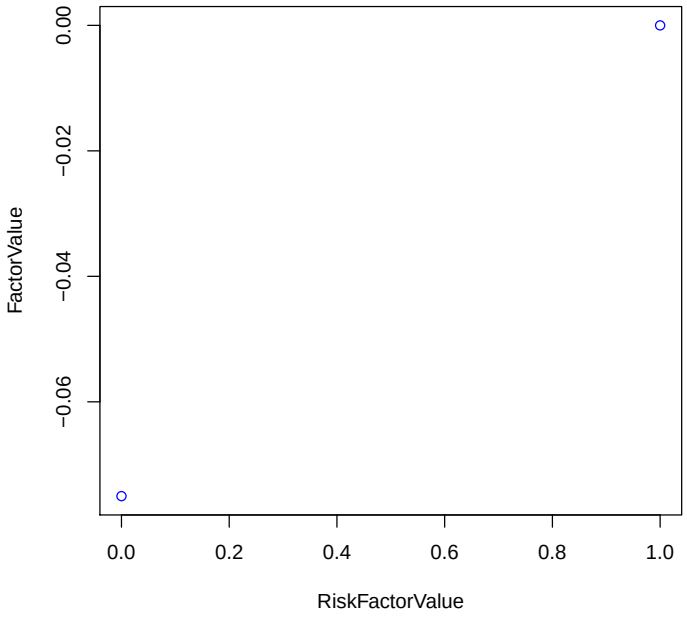

Figure 5: OR ratio vs Gender

0.6.4 AdjustedWaist

Since BMI and Waist are highly correlated, together they can't contribute to the prediction. Infact Waist can be predicted by BMI, linear regression results in : Waist = 2.74 * BMI - 16.9 AdjustedWaist is the difference between an actual Waist and the predicted waist from BMI (basically the error) so, we have: WaistAdjustedBMI = waist - 2.74 * BMI + 16.9

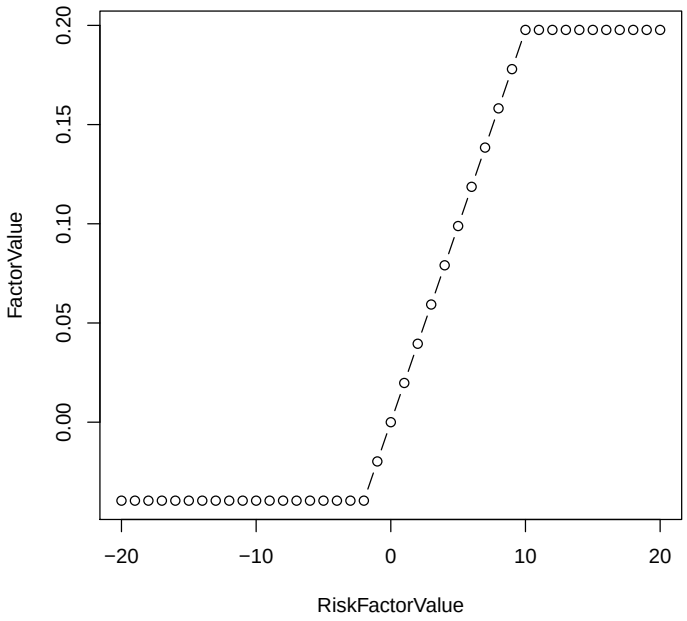

Figure 6: OR vs AdjustedWaist

0.6.5 Trig

Without further do we present the plot here that shows the Odds ratio with differen Trig values

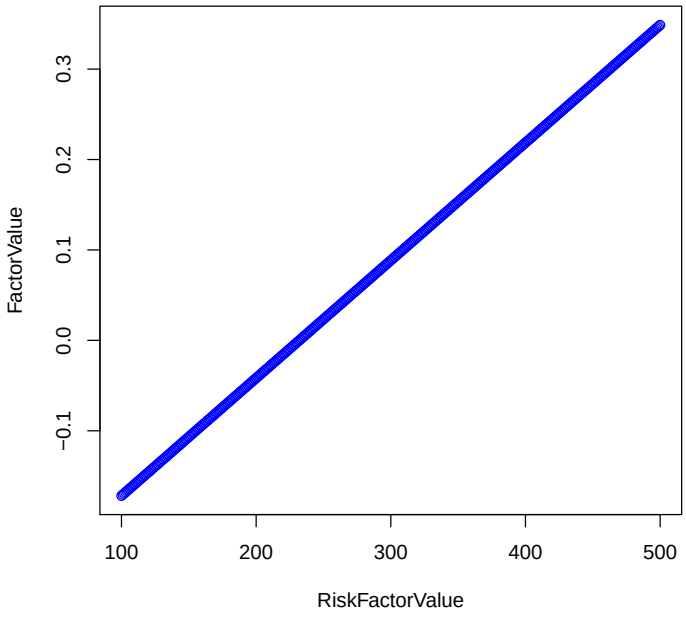

Figure 7: OR vs Trig

0.6.6 Smoking

Well, obviously smoking is bad for you! this should depict how bad it could be

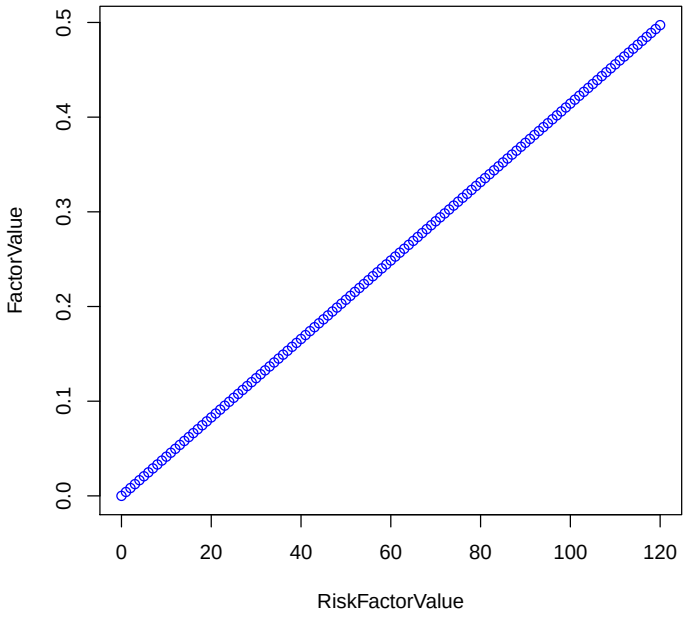

Figure 8: OR vs Smoking

Bibliography

[1] Mark Eric Dyken and Kyoung Bin Im. Obstructive sleep apnea and stroke. *Chest*, 136(6):1668–1677, Dec 2009.

[2] Hyeon Chang Kim, Chung Mo Nam, Sun Ha Jee, and Il Suh. Comparison of blood pressure-associated risk of intracerebral hemorrhage and subarachnoid hemorrhage: Korea medical insurance corporation study. *Hypertension*, 46(2):393–397, Aug 2005.

[3] Patrick M Pullicino, Leslie A McClure, Virginia G Wadley, Ali Ahmed, Virginia J Howard, George Howard, and Monika M Safford. Blood pressure and stroke in heart failure in the reasons for geographic and racial differences in stroke (regards) study. *Stroke*, 40(12):3706–3710, Dec 2009.

[4] Eyal Shahar, Lloyd E Chambless, Wayne D Rosamond, Lori L Boland, Christie M Ballantyne, Paul G McGovern, A. Richey Sharrett, and Atherosclerosis Risk in Communities Study. Plasma lipid profile and incident ischemic stroke: the atherosclerosis risk in communities (aric) study. *Stroke*, 34(3):623–631, Mar 2003.