R Notebook

#> # A tibble: 4 x 1  
#> temperature  
#> <chr>   
#> 1 No   
#> 2 37.5-38   
#> 3 38.1-39   
#> 4 39.1-41  
#> # A tibble: 4 x 1  
#> temperature  
#> <chr>   
#> 1 37   
#> 2 37.5-38   
#> 3 38.1-39   
#> 4 39.1-41

# Introduction

I have undertaken several steps in modeling:

- I have looked at age variable and compared it to the comorbidities, thus attempting to find some age band groupings

- I have added counts of gender as well as patients that declare whether they are covid tested negative, positive or showing symptoms of covid (that never been tested) - added a correlation matrix - I have used stepwise logistic regression , with forward method(see Appendices) - taken out covid\_tested variable and fatigue (as it seems to be correlated with muscle ache - the highest score (0.453) yet not even reaching 0.50; But took it out from the analysis - I, then build the final model based on stepwise logistic model output - I have computed the odd ratios - I have computed the confidence intervals - I have also reported the findings just to check whether I write well the findings - however, not sure whether I shall report age - how to report them as I am trying to understand more on how to group age and age bands -

Yet, what I have to consider is: - adjusting for multiple testing? - variance inflation factor (some are even calling this multiconlinearity but not sure of myself)? - and the last stage would be comparing the findings between all models - but also trying to understand the concept of confounders in health statistics

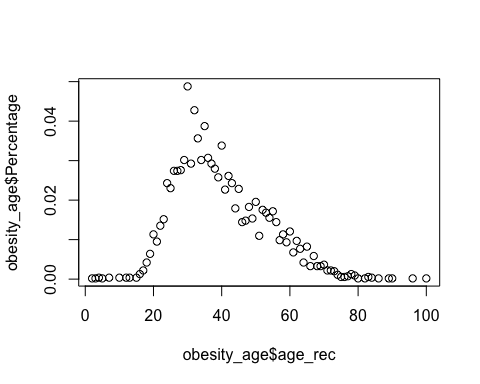
# Exploring the data

Age variable may not fit the model well. Therefore, I am calculating the percentages of age with comorbidities and see whether I can spot any age groups. I have 9 comorbidities and will take age and calculate the percentages. Obesity, diabetes type I and II, asthma, hypertension, heart\_disease, lung condition, liver disease and kidney disease are the variables that would be calculated against age with the purpose of whether we can spot different age bands. Yet, analysis revealed different age bands based on observations made when observed towards different comorbidity groups. Yet, if I choose different age bands are these, then comparable? I thought it is worth keeping similar age bands across different models for the sake of comparability?I I will therefore, keep the age bands as 0-20, 21-30, 31 - 40, 41 -50, 51-60, 61-70, 71-80, 81-100, for the sake of comparability. But I have to check with more collegues on this.

# Obesity by age.

The plot suggests some groups. From 0-20 we have first group since no obese in this group. However, with the increase of obesity from 20 years old to approx 40, we may have another age group, but we can see that from 20-30 obesity is increasing and then it starts decreasing from 30 to 40 and even towards 50 and 60 years of age. However, from aprox 60 to 80 it is show less obesity, with 80 to 100 no obesity. Therefore, the age groups are 0-20, 21-30, 31-40, 41-50, 51-60, 61-70, 71-80, 80-100.

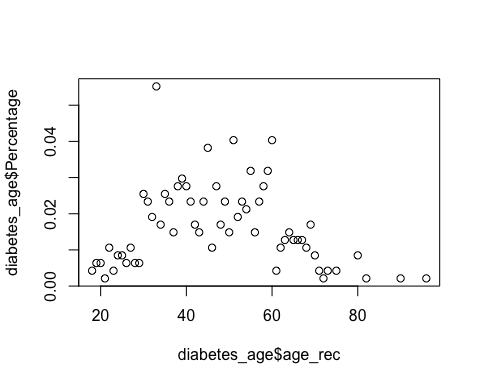
#> # A tibble: 82 x 3  
#> age\_rec n Percentage  
#> <dbl> <int> <dbl>  
#> 1 2 1 0.000183  
#> 2 3 1 0.000183  
#> 3 4 2 0.000365  
#> 4 5 1 0.000183  
#> 5 7 2 0.000365  
#> 6 10 2 0.000365  
#> 7 12 2 0.000365  
#> 8 13 2 0.000365  
#> 9 15 2 0.000365  
#> 10 16 7 0.00128   
#> # … with 72 more rows



# Diabetes type I

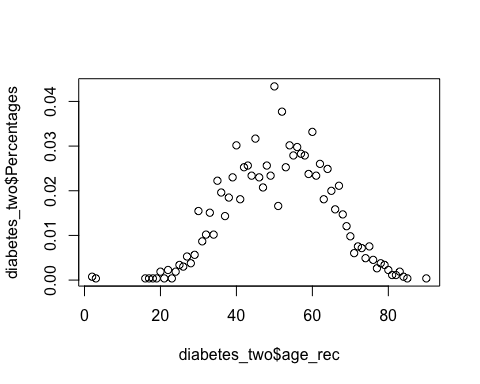
Similar to obesity, the same groups can be spotted with the difference in groups 20-30 since there seem to be less respondents suffering of diabetes type 1, compared to 30 and 40 age group. 40 to 60 would form another group. Whereas 60 to 70 years of age and 80 to 100 would be treated as different groups.Thus, 0-20, 21 -30, 31-40, 41-60, 61-70, 70-80, 81-100.

#> # A tibble: 61 x 3  
#> age\_rec n Percentage  
#> <dbl> <int> <dbl>  
#> 1 18 2 0.00425  
#> 2 19 3 0.00637  
#> 3 20 3 0.00637  
#> 4 21 1 0.00212  
#> 5 22 5 0.0106   
#> 6 23 2 0.00425  
#> 7 24 4 0.00849  
#> 8 25 4 0.00849  
#> 9 26 3 0.00637  
#> 10 27 5 0.0106   
#> # … with 51 more rows



# Diabetes type II

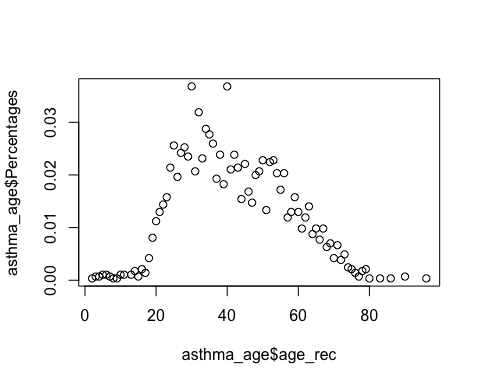
As the plot suggests, following groups may be formed, 0-20, 21-30, 31-40, 41-60, 61-70, 71-80, 80-100.



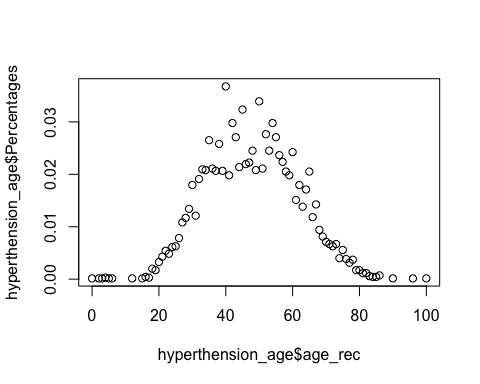
# Asthma

Asthma reveals the same patters with difference in 25 to 40 years of age, although debatable. Therefore the groups chosen for asthma modelling are 0-20, 21-30, 31-40, 41-50, 51-60, 61-70, 71-80, 81-100.

#> # A tibble: 82 x 3  
#> age\_rec n Percentages  
#> <dbl> <int> <dbl>  
#> 1 2 1 0.000351  
#> 2 3 2 0.000701  
#> 3 4 2 0.000701  
#> 4 5 3 0.00105   
#> 5 6 3 0.00105   
#> 6 7 2 0.000701  
#> 7 8 1 0.000351  
#> 8 9 1 0.000351  
#> 9 10 3 0.00105   
#> 10 11 3 0.00105   
#> # … with 72 more rows

 # Hypertension Hypertension and age shows similiarities with previous plots. Therefore, the age\_bands are 0-20, 21-30, 31-40, 41-50, 51-60, 61-70, 71-80, 81-100.

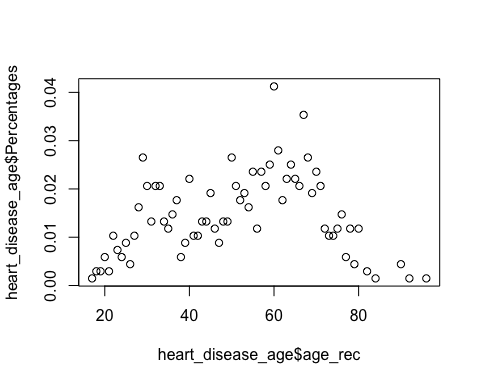
#> # A tibble: 82 x 3  
#> age\_rec n Percentages  
#> <dbl> <int> <dbl>  
#> 1 0 1 0.000143  
#> 2 2 1 0.000143  
#> 3 3 1 0.000143  
#> 4 4 2 0.000285  
#> 5 5 1 0.000143  
#> 6 6 1 0.000143  
#> 7 12 1 0.000143  
#> 8 15 1 0.000143  
#> 9 16 3 0.000428  
#> 10 17 2 0.000285  
#> # … with 72 more rows



# Heart disease

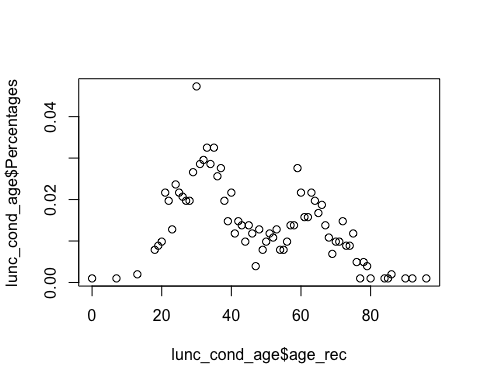
Heart disease by age. The plot reveals different groups - 0-20, 21-30, 31-40, 41-50, 51-70, 71-80, 80-100.

#> # A tibble: 69 x 3  
#> age\_rec n Percentages  
#> <dbl> <int> <dbl>  
#> 1 17 1 0.00147  
#> 2 18 2 0.00295  
#> 3 19 2 0.00295  
#> 4 20 4 0.00589  
#> 5 21 2 0.00295  
#> 6 22 7 0.0103   
#> 7 23 5 0.00736  
#> 8 24 4 0.00589  
#> 9 25 6 0.00884  
#> 10 26 3 0.00442  
#> # … with 59 more rows



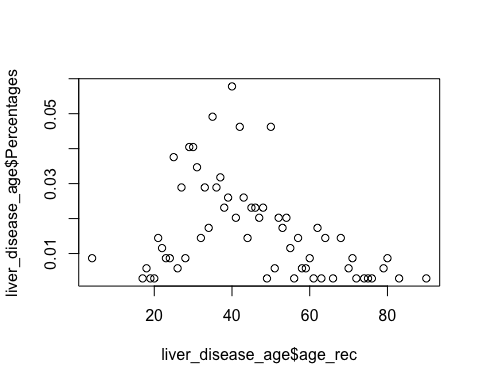
# Lung condition

Lung condidition by age.Groups emerging such as 0-20, 21-30, 31-40, 41-60, 61-70, 71-80, 80-100.



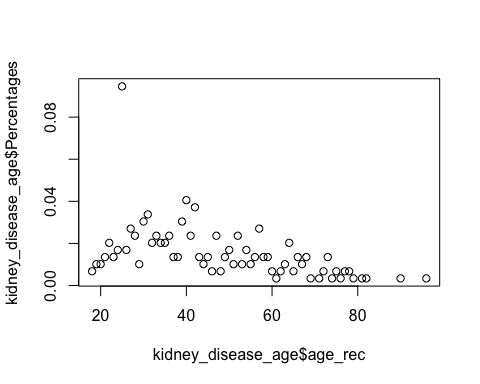
# Liver disease

Liver disease ha hig variation within the groups of 30 all the way to 40, the same as for the 40 to 50, yet not as in the 30 and 40 group. I would create groups from 0-20, 21-30, 31-40, 41-50, 51-60, 61-80. 80-100.



# Kidney disease

Kindney disease is suggesting more or less the same grouping. From 0-20, 21-30, 31-40, 41-60, 61-80, 80-100.



# Conclusion

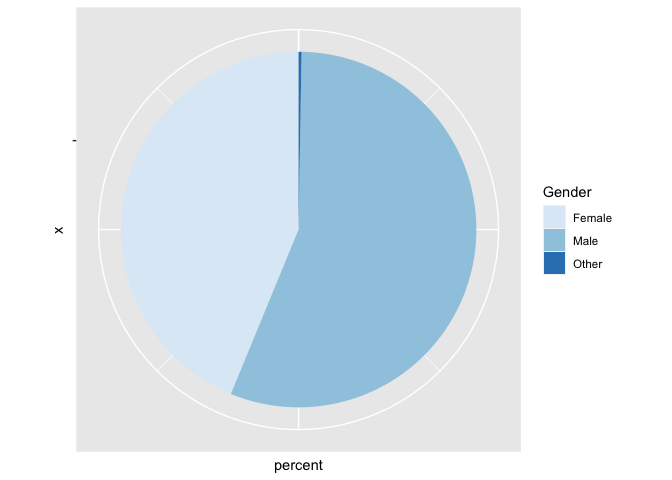
As a conclusion, obesity, diabetes type I, asthma, hypertension suggest same age grouping, from 0-20, 21-30, 31 - 40, 41 -50, 51-60, 61-70, 71-80, 81-100. Yet, diabetes type II and lung condition and kidney disease suggest that 41 to 60 year olds may be grouped within the same age band. Heart disease suggest age bands from 51-70 and liver disease and kidney disease suggest 61 to 80 years olds forming the same age bands.

However, if I have different age bands for different models, are these, then comparable? Is it worth keeping similar age bands across different models for the sake of comparability? I will therefore, keep the age bands as 0-20, 21-30, 31 - 40, 41 -50, 51-60, 61-70, 71-80, 81-100, for the sake of comparability.

# Gender

How many male and female we have in our dataset? There are 33.957 male accounting for 56 percent whilst femlae are 26.574 accounting for 44 percent and we have very low percent of other group. As observed, there are 6.383 more male than female.

# A tibble: 3 x 3

Gender n percent 1 Female 26574 0.438  
2 Male 33952 0.559  
3 Other 163 0.00269 

# Covid tested positive, negative, showing symptoms

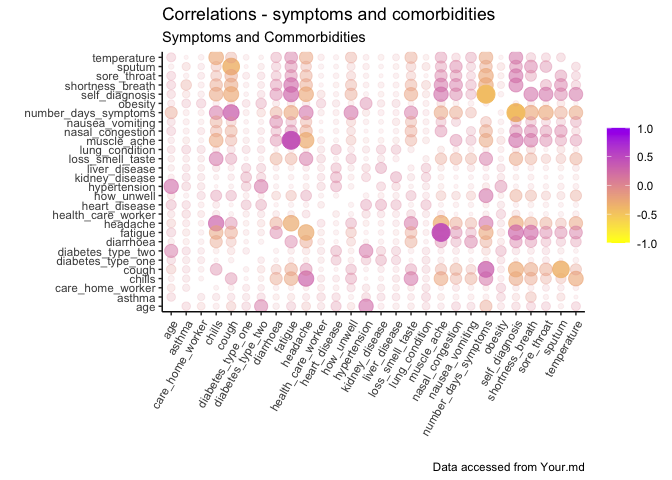
I have recorded showing symptoms on its own category since a lot of respondents have not been tested but declare they show symptoms. I am keeping this three categories as they are since I am not attempting any predictive modeling but rather looking to differences and similarities symptoms of Covid in different comorbidity groups.

Table bellow is showing there are 8748 respondents showing symptoms but not tested, 713 tested positive and 51.351 are negative. # A tibble: 3 x 2 covid\_tested n 1 negative 51351 2 positive 713 3 showing symptoms 8748

# Correlations

Correlations matrix is done on numerical variables. However, I have transformed the categorical variables into numerical ones, as I cannot correlate all categorical variables once. From the correlation matrixt, it is noticed, fatigue and muscle ache seem to be correlated, but only with 0.43550, the highest correlation. Yet, for the highest correlation, it is not even passing the 0.5. However, I choose to take out of the analysis the fatigue variable.

# A tibble: 28 x 29

rowname number\_days\_sym… headache chills cough loss\_smell\_taste 1 number… NA 0.229 0.210 0.320 0.192  
2 headac… 0.229 NA 0.293 0.149 0.203  
3 chills 0.210 0.293 NA 0.137 0.217  
4 cough 0.320 0.149 0.137 NA 0.122  
5 loss\_s… 0.192 0.203 0.217 0.122 NA  
6 how\_un… 0.227 0.107 0.115 0.0992 0.0874 7 asthma 0.0123 0.0258 0.0285 0.0323 0.0217 8 lung\_c… 0.0145 0.0105 0.0236 0.0413 0.0159 9 obesity 0.00850 0.0278 0.0151 0.0235 0.00821 10 health… 0.0155 0.0370 0.0278 0.00316 0.0538 # … with 18 more rows, and 23 more variables: how\_unwell , asthma , # lung\_condition , obesity , health\_care\_worker , # liver\_disease , kidney\_disease , heart\_disease , # diabetes\_type\_one , care\_home\_worker , hypertension , # diabetes\_type\_two , age , nausea\_vomiting , diarrhoea , # nasal\_congestion , sputum , sore\_throat , temperature , # shortness\_breath , muscle\_ache , fatigue , # self\_diagnosis 

# Analysis

# Obesity

What are the Covid-19 symptoms associated with obesity? The model has been achieved by using stepwise logistic modeling, using forward method approach. I have used result from stepwise model to build the final model.

#>   
#> Call:  
#> glm(formula = obesity ~ muscle\_ache + sputum + diarrhoea + shortness\_breath +   
#> loss\_smell\_taste + temperature + age\_band + Gender, family = "binomial",   
#> data = obesity\_data)  
#>   
#> Deviance Residuals:   
#> Min 1Q Median 3Q Max   
#> -0.7087 -0.4553 -0.4092 -0.3851 2.4884   
#>   
#> Coefficients:  
#> Estimate Std. Error z value Pr(>|z|)   
#> (Intercept) -2.69971 0.08632 -31.277 < 2e-16 \*\*\*  
#> muscle\_acheYes 0.29262 0.03323 8.806 < 2e-16 \*\*\*  
#> sputumYes 0.23244 0.03232 7.191 6.44e-13 \*\*\*  
#> diarrhoeaYes 0.18403 0.05090 3.616 0.000299 \*\*\*  
#> shortness\_breathYes 0.10182 0.03787 2.688 0.007178 \*\*   
#> loss\_smell\_tasteYes -0.10956 0.05671 -1.932 0.053361 .   
#> temperature37.5-38 -0.12196 0.05503 -2.216 0.026665 \*   
#> temperature38.1-39 0.13748 0.11732 1.172 0.241237   
#> temperature39.1-41 0.22209 0.27026 0.822 0.411205   
#> age\_band21-30 0.19722 0.08837 2.232 0.025629 \*   
#> age\_band31-40 0.41318 0.08741 4.727 2.28e-06 \*\*\*  
#> age\_band41-50 0.48528 0.08976 5.407 6.42e-08 \*\*\*  
#> age\_band51-60 0.45104 0.09239 4.882 1.05e-06 \*\*\*  
#> age\_band61-70 0.26918 0.10302 2.613 0.008981 \*\*   
#> age\_band71-80 0.02139 0.15440 0.139 0.889830   
#> age\_band81-100 0.45705 0.36205 1.262 0.206812   
#> GenderMale -0.22825 0.02870 -7.953 1.82e-15 \*\*\*  
#> GenderOther 0.12153 0.25168 0.483 0.629186   
#> ---  
#> Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
#>   
#> (Dispersion parameter for binomial family taken to be 1)  
#>   
#> Null deviance: 36757 on 60683 degrees of freedom  
#> Residual deviance: 36372 on 60666 degrees of freedom  
#> AIC: 36408  
#>   
#> Number of Fisher Scoring iterations: 5

When adjusting for all variables, for obese group, the results show (strong) evidence for an association between Covid-19 symptoms such as: - muscle ache, shortness of breath, loss of smell and taste temperature (p≤0.05) for obese patients - sputum and diarrhea for obese respondents (p≤ 0.01).

Obese respondents are: - 3 times more likely to experience muscle ache compared to those who do not - are 1 time more likely to experience shortness of breath compared to those who do not - and 2 times more likely to experience temperature compared to those who do not.

#> 2.5 % 97.5 %  
#> (Intercept) -2.87263739 -2.5340557841  
#> muscle\_acheYes 0.22729963 0.3575725650  
#> sputumYes 0.16888439 0.2955987049  
#> diarrhoeaYes 0.08337471 0.2829174123  
#> shortness\_breathYes 0.02723739 0.1757105781  
#> loss\_smell\_tasteYes -0.22191161 0.0004251415  
#> temperature37.5-38 -0.23108029 -0.0153221736  
#> temperature38.1-39 -0.09880889 0.3616029751  
#> temperature39.1-41 -0.34502581 0.7214323817  
#> age\_band21-30 0.02730948 0.3739370294  
#> age\_band31-40 0.24524404 0.5881193545  
#> age\_band41-50 0.31251800 0.6645965851  
#> age\_band51-60 0.27285483 0.6352665558  
#> age\_band61-70 0.06901286 0.4731479650  
#> age\_band71-80 -0.28716431 0.3191030975  
#> age\_band81-100 -0.32106842 1.1146569055  
#> GenderMale -0.28450340 -0.1719917735  
#> GenderOther -0.40562452 0.5868441762  
#> 2.5 % 97.5 %  
#> (Intercept) 0.05654959 0.07933659  
#> muscle\_acheYes 1.25520591 1.42985432  
#> sputumYes 1.18398326 1.34393074  
#> diarrhoeaYes 1.08694902 1.32699556  
#> shortness\_breathYes 1.02761171 1.19209299  
#> loss\_smell\_tasteYes 0.80098616 1.00042523  
#> temperature37.5-38 0.79367574 0.98479461  
#> temperature38.1-39 0.90591582 1.43562885  
#> temperature39.1-41 0.70820208 2.05737805  
#> age\_band21-30 1.02768580 1.45344562  
#> age\_band31-40 1.27793314 1.80059894  
#> age\_band41-50 1.36686254 1.94370624  
#> age\_band51-60 1.31370952 1.88752521  
#> age\_band61-70 1.07144999 1.60503885  
#> age\_band71-80 0.75038842 1.37589317  
#> age\_band81-100 0.72537362 3.04852207  
#> GenderMale 0.75238779 0.84198610  
#> GenderOther 0.66656040 1.79830432

#> (Intercept) muscle\_acheYes sputumYes diarrhoeaYes   
#> -93.277480 33.993733 26.167164 20.204828   
#> shortness\_breathYes loss\_smell\_tasteYes temperature37.5-38 temperature38.1-39   
#> 10.718572 -10.376991 -11.481986 14.738043   
#> temperature39.1-41 age\_band21-30 age\_band31-40 age\_band41-50   
#> 24.868579 21.800864 51.161838 62.463081   
#> age\_band51-60 age\_band61-70 age\_band71-80 age\_band81-100   
#> 56.994471 30.889253 2.161814 57.940700   
#> GenderMale GenderOther   
#> -20.407685 12.922261

# Asthma

Next question to be addressed is what are the Covid-19 symptoms associated with asthma? The final model has been achieved through stepwise method, see appendices.

When adjusting for all variables, for asthmatic patients, the results show a strong association: - of Covid-19 symptoms such as (shorthness of breath and temperature (p≤0.001) - of other symptoms such as sputum and sore throat (p≤0.001)

Moreover, asthmatic patients are: - almost 2 times more likely to experienced shortness of breath compared to those at baseline(negative response); - 3 times more likely to experience sputum than those at the baseling(negative response). - 8 times more likely to experience 39.1-41 temperature compared to those at baseline(negative response).

#>   
#> Call:  
#> glm(formula = asthma ~ shortness\_breath + sputum + sore\_throat +   
#> temperature + Gender + age\_band, family = "binomial", data = asthma\_data)  
#>   
#> Deviance Residuals:   
#> Min 1Q Median 3Q Max   
#> -0.8947 -0.3376 -0.2697 -0.2127 2.9494   
#>   
#> Coefficients:  
#> Estimate Std. Error z value Pr(>|z|)   
#> (Intercept) -3.03697 0.10373 -29.278 < 2e-16 \*\*\*  
#> shortness\_breathYes 1.06750 0.04307 24.787 < 2e-16 \*\*\*  
#> sputumYes 0.27350 0.04332 6.313 2.74e-10 \*\*\*  
#> sore\_throatYes -0.22910 0.04442 -5.158 2.50e-07 \*\*\*  
#> temperature37.5-38 -0.10685 0.07460 -1.432 0.152055   
#> temperature38.1-39 -0.20342 0.17337 -1.173 0.240663   
#> temperature39.1-41 0.62284 0.29262 2.128 0.033298 \*   
#> GenderMale -0.65325 0.03984 -16.396 < 2e-16 \*\*\*  
#> GenderOther -0.44829 0.39125 -1.146 0.251885   
#> age\_band21-30 -0.21385 0.10782 -1.983 0.047317 \*   
#> age\_band31-40 -0.08721 0.10680 -0.817 0.414183   
#> age\_band41-50 0.23117 0.10894 2.122 0.033830 \*   
#> age\_band51-60 0.39461 0.11067 3.566 0.000363 \*\*\*  
#> age\_band61-70 0.47665 0.11977 3.980 6.90e-05 \*\*\*  
#> age\_band71-80 0.59340 0.15790 3.758 0.000171 \*\*\*  
#> age\_band81-100 -0.08457 0.52689 -0.161 0.872483   
#> ---  
#> Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
#>   
#> (Dispersion parameter for binomial family taken to be 1)  
#>   
#> Null deviance: 23003 on 60683 degrees of freedom  
#> Residual deviance: 21799 on 60668 degrees of freedom  
#> AIC: 21831  
#>   
#> Number of Fisher Scoring iterations: 6

#> (Intercept) shortness\_breathYes sputumYes sore\_throatYes   
#> -95.201977 190.810367 31.455103 -20.474754   
#> temperature37.5-38 temperature38.1-39 temperature39.1-41 GenderMale   
#> -10.133547 -18.406196 86.420738 -47.964675   
#> GenderOther age\_band21-30 age\_band31-40 age\_band41-50   
#> -36.128071 -19.252714 -8.351520 26.007600   
#> age\_band51-60 age\_band61-70 age\_band71-80 age\_band81-100   
#> 48.380802 61.067618 81.014115 -8.109058

#> 2.5 % 97.5 %  
#> (Intercept) -3.245627100 -2.838645775  
#> shortness\_breathYes 0.982869739 1.151706308  
#> sputumYes 0.188265230 0.358110858  
#> sore\_throatYes -0.316595042 -0.142468810  
#> temperature37.5-38 -0.255636516 0.036915005  
#> temperature38.1-39 -0.559781848 0.121705346  
#> temperature39.1-41 0.006889881 1.162279825  
#> GenderMale -0.731527230 -0.575332534  
#> GenderOther -1.313230654 0.243558396  
#> age\_band21-30 -0.420769699 0.002261544  
#> age\_band31-40 -0.292015272 0.127039851  
#> age\_band41-50 0.021931171 0.449357007  
#> age\_band51-60 0.181778786 0.615989342  
#> age\_band61-70 0.244833580 0.714782321  
#> age\_band71-80 0.281090927 0.901004836  
#> age\_band81-100 -1.292137318 0.827570430

#> 2.5 % 97.5 %  
#> (Intercept) 0.03894413 0.05850484  
#> shortness\_breathYes 2.67211352 3.16358636  
#> sputumYes 1.20715365 1.43062421  
#> sore\_throatYes 0.72862576 0.86721460  
#> temperature37.5-38 0.77442341 1.03760483  
#> temperature38.1-39 0.57133369 1.12942126  
#> temperature39.1-41 1.00691367 3.19721406  
#> GenderMale 0.48117357 0.56251778  
#> GenderOther 0.26894977 1.27578082  
#> age\_band21-30 0.65654129 1.00226410  
#> age\_band31-40 0.74675713 1.13546227  
#> age\_band41-50 1.02217343 1.56730410  
#> age\_band51-60 1.19934885 1.85148745  
#> age\_band61-70 1.27740871 2.04374175  
#> age\_band71-80 1.32457404 2.46207585  
#> age\_band81-100 0.27468307 2.28775373

# Diabetes type I

Third question is what are the factors associated with diabetes type I? See appendinces for stepwise selection method that was used to aid the findings of variables which are statisically relevant of this comorbidity.

When adjusting for all variables, for diabetes type 1 comorbidity group, the results show strong evidence of association: - of Covid-19 symptoms (cough, temperature - p≤0.05)

Evidence shows patients with diabetes type I are: - 4 times more likely to experience cough compared to those at the baseline(negative response) - 4 times more likely to experience 37.5-38 temperature; - 8 times more likely to experience 38.1-39 and - 39- 41 temperature compared to those who do not have temperature.

#>   
#> Call:  
#> glm(formula = diabetes\_type\_one ~ cough + muscle\_ache + temperature +   
#> sore\_throat + age\_band + Gender, family = "binomial", data = diabetes\_1\_data)  
#>   
#> Deviance Residuals:   
#> Min 1Q Median 3Q Max   
#> -0.6369 -0.1495 -0.1080 -0.0763 3.7469   
#>   
#> Coefficients:  
#> Estimate Std. Error z value Pr(>|z|)   
#> (Intercept) -6.10686 0.36650 -16.663 < 2e-16 \*\*\*  
#> coughYes 0.36213 0.10243 3.535 0.000407 \*\*\*  
#> muscle\_acheYes -0.29589 0.12316 -2.402 0.016286 \*   
#> temperature37.5-38 0.31612 0.16898 1.871 0.061370 .   
#> temperature38.1-39 0.61132 0.34437 1.775 0.075866 .   
#> temperature39.1-41 2.24602 0.38020 5.907 3.47e-09 \*\*\*  
#> sore\_throatYes -0.39674 0.11736 -3.380 0.000724 \*\*\*  
#> age\_band21-30 -0.21914 0.38751 -0.566 0.571726   
#> age\_band31-40 0.80837 0.36690 2.203 0.027578 \*   
#> age\_band41-50 1.16570 0.36972 3.153 0.001616 \*\*   
#> age\_band51-60 1.81543 0.36674 4.950 7.42e-07 \*\*\*  
#> age\_band61-70 1.65292 0.38108 4.337 1.44e-05 \*\*\*  
#> age\_band71-80 1.34267 0.46789 2.870 0.004110 \*\*   
#> age\_band81-100 1.94339 0.79946 2.431 0.015063 \*   
#> GenderMale 0.48701 0.09858 4.940 7.80e-07 \*\*\*  
#> GenderOther -11.25310 182.94426 -0.062 0.950952   
#> ---  
#> Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
#>   
#> (Dispersion parameter for binomial family taken to be 1)  
#>   
#> Null deviance: 5505.4 on 60683 degrees of freedom  
#> Residual deviance: 5234.0 on 60668 degrees of freedom  
#> AIC: 5266  
#>   
#> Number of Fisher Scoring iterations: 15

#> (Intercept) coughYes muscle\_acheYes temperature37.5-38   
#> -99.77725 43.63869 -25.61344 37.17975   
#> temperature38.1-39 temperature39.1-41 sore\_throatYes age\_band21-30   
#> 84.28653 845.00228 -32.74921 -19.67940   
#> age\_band31-40 age\_band41-50 age\_band51-60 age\_band61-70   
#> 124.42577 220.81752 514.36931 422.22168   
#> age\_band71-80 age\_band81-100 GenderMale GenderOther   
#> 282.92639 598.23558 62.74457 -99.99870

#> 2.5 % 97.5 %  
#> (Intercept) -6.91034600 -5.45509853  
#> coughYes 0.15935085 0.56115002  
#> muscle\_acheYes -0.54253167 -0.05924624  
#> temperature37.5-38 -0.02914608 0.63490025  
#> temperature38.1-39 -0.13896627 1.22681273  
#> temperature39.1-41 1.42126295 2.93084967  
#> sore\_throatYes -0.63119316 -0.17068763  
#> age\_band21-30 -0.92381640 0.61599730  
#> age\_band31-40 0.15474281 1.61210686  
#> age\_band41-50 0.50515886 1.97374244  
#> age\_band51-60 1.16219696 2.61890918  
#> age\_band61-70 0.96444698 2.47836301  
#> age\_band71-80 0.43196497 2.29743823  
#> age\_band81-100 0.04088078 3.34855825  
#> GenderMale 0.29549966 0.68220983  
#> GenderOther -99.02732433 -130.03558216

#> 2.5 % 97.5 %  
#> (Intercept) 9.974126e-04 4.274456e-03  
#> coughYes 1.172749e+00 1.752687e+00  
#> muscle\_acheYes 5.812748e-01 9.424747e-01  
#> temperature37.5-38 9.712746e-01 1.886834e+00  
#> temperature38.1-39 8.702574e-01 3.410343e+00  
#> temperature39.1-41 4.142349e+00 1.874355e+01  
#> sore\_throatYes 5.319567e-01 8.430849e-01  
#> age\_band21-30 3.970010e-01 1.851502e+00  
#> age\_band31-40 1.167358e+00 5.013363e+00  
#> age\_band41-50 1.657249e+00 7.197563e+00  
#> age\_band51-60 3.196949e+00 1.372075e+01  
#> age\_band61-70 2.623336e+00 1.192173e+01  
#> age\_band71-80 1.540281e+00 9.948664e+00  
#> age\_band81-100 1.041728e+00 2.846167e+01  
#> GenderMale 1.343798e+00 1.978244e+00  
#> GenderOther 9.839646e-44 3.359419e-57

# Diabetes type 2

Fourth question is what are the factors associated with diabetes type 2? See appendices for stepwise selection method that was used to aid the findings of variables which are statisically relevant of diabetes type II.

When adjusting for all variables, for diabetes type 2 group, the results show strong evidence of associations: - of Covid-19 symptoms (temperature and nausea and vomiting - p≤0.01)

Moreover, respondents suffering of diabetes type two are: - almost 4 times more likely to experience 37.5-38 temperature, - almost 9 times more likely to experience 38.1 -39 and 39.1-41 temperature.

#>   
#> Call:  
#> glm(formula = diabetes\_type\_two ~ sore\_throat + cough + temperature +   
#> headache + chills + loss\_smell\_taste + nausea\_vomiting +   
#> age\_band + Gender, family = "binomial", data = diabetes\_2\_data)  
#>   
#> Deviance Residuals:   
#> Min 1Q Median 3Q Max   
#> -0.8947 -0.3575 -0.2185 -0.1205 3.4403   
#>   
#> Coefficients:  
#> Estimate Std. Error z value Pr(>|z|)   
#> (Intercept) -5.57162 0.29219 -19.068 < 2e-16 \*\*\*  
#> sore\_throatYes -0.16188 0.05081 -3.186 0.001444 \*\*   
#> coughYes -0.17989 0.05043 -3.567 0.000361 \*\*\*  
#> temperature37.5-38 0.33356 0.08038 4.150 3.33e-05 \*\*\*  
#> temperature38.1-39 0.61778 0.16605 3.720 0.000199 \*\*\*  
#> temperature39.1-41 0.66335 0.36252 1.830 0.067273 .   
#> headacheYes -0.16350 0.05930 -2.757 0.005832 \*\*   
#> chillsYes -0.14202 0.08853 -1.604 0.108674   
#> loss\_smell\_tasteYes -0.13944 0.09094 -1.533 0.125190   
#> nausea\_vomitingYes 0.19600 0.12725 1.540 0.123499   
#> age\_band21-30 0.26980 0.30488 0.885 0.376189   
#> age\_band31-40 1.63008 0.29342 5.556 2.77e-08 \*\*\*  
#> age\_band41-50 2.66806 0.29227 9.129 < 2e-16 \*\*\*  
#> age\_band51-60 3.17893 0.29227 10.877 < 2e-16 \*\*\*  
#> age\_band61-70 3.49549 0.29379 11.898 < 2e-16 \*\*\*  
#> age\_band71-80 3.48016 0.30471 11.421 < 2e-16 \*\*\*  
#> age\_band81-100 3.63604 0.40591 8.958 < 2e-16 \*\*\*  
#> GenderMale 0.56002 0.04346 12.885 < 2e-16 \*\*\*  
#> GenderOther 1.29890 0.29649 4.381 1.18e-05 \*\*\*  
#> ---  
#> Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
#>   
#> (Dispersion parameter for binomial family taken to be 1)  
#>   
#> Null deviance: 21790 on 60683 degrees of freedom  
#> Residual deviance: 19123 on 60665 degrees of freedom  
#> AIC: 19161  
#>   
#> Number of Fisher Scoring iterations: 7

#> (Intercept) sore\_throatYes coughYes temperature37.5-38   
#> -99.61957 -14.94567 -16.46385 39.59291   
#> temperature38.1-39 temperature39.1-41 headacheYes chillsYes   
#> 85.48080 94.12938 -15.08343 -13.23975   
#> loss\_smell\_tasteYes nausea\_vomitingYes age\_band21-30 age\_band31-40   
#> -13.01543 21.65310 30.97065 410.42952   
#> age\_band41-50 age\_band51-60 age\_band61-70 age\_band71-80   
#> 1341.20349 2302.10023 3196.62838 3146.49642   
#> age\_band81-100 GenderMale GenderOther   
#> 3694.14125 75.07019 266.52781

Confidence intervals diabetes type 2

#> 2.5 % 97.5 %  
#> (Intercept) -6.20231588 -5.04589576  
#> sore\_throatYes -0.26213991 -0.06291523  
#> coughYes -0.27940643 -0.08167141  
#> temperature37.5-38 0.17351248 0.48877187  
#> temperature38.1-39 0.28015615 0.93249284  
#> temperature39.1-41 -0.11552128 1.32204944  
#> headacheYes -0.28078994 -0.04828206  
#> chillsYes -0.31824646 0.02894889  
#> loss\_smell\_tasteYes -0.32108146 0.03560162  
#> nausea\_vomitingYes -0.06070652 0.43876036  
#> age\_band21-30 -0.28590298 0.92082676  
#> age\_band31-40 1.10143569 2.26271975  
#> age\_band41-50 2.14211157 3.29885549  
#> age\_band51-60 2.65299029 3.80971591  
#> age\_band61-70 2.96599433 4.12872537  
#> age\_band71-80 2.92513186 4.13101075  
#> age\_band81-100 2.84266606 4.45050621  
#> GenderMale 0.47514393 0.64553749  
#> GenderOther 0.67656315 1.84718066

#> 2.5 % 97.5 %  
#> (Intercept) 0.002024736 0.006435693  
#> sore\_throatYes 0.769403369 0.939023075  
#> coughYes 0.756232484 0.921574726  
#> temperature37.5-38 1.189475530 1.630312760  
#> temperature38.1-39 1.323336434 2.540835177  
#> temperature39.1-41 0.890901618 3.751101171  
#> headacheYes 0.755186950 0.952864986  
#> chillsYes 0.727423484 1.029371984  
#> loss\_smell\_tasteYes 0.725364163 1.036242941  
#> nausea\_vomitingYes 0.941099395 1.550783614  
#> age\_band21-30 0.751335511 2.511365818  
#> age\_band31-40 3.008482178 9.609188202  
#> age\_band41-50 8.517403755 27.081626107  
#> age\_band51-60 14.196426653 45.137614105  
#> age\_band61-70 19.413997650 62.098719464  
#> age\_band71-80 18.636683325 62.240800973  
#> age\_band81-100 17.161458160 85.670299970  
#> GenderMale 1.608245654 1.907011752  
#> GenderOther 1.967105450 6.341914288

# Hypertension

Fifth question is what are the Covid-19 symptons hypertensive patients are experiencing?

When adjusting for all variables, for the hypertensive patients, the results show strong evidence: - of associations of Covid-19 symptoms such as muscle ache, temperature, cough - and other symptoms such as sputum, nasal congestion, diarrhea (p≤0.05)

Moreover, respondents suffering of hypertension are: - almost 2 times more likely to experience muscle ache - almost 3 times more to experience 38.1-39 temperature - and almost 4 times more likely to experience 39.1-41 temperature  
- 6 times more likely to experience cough compared - 1 time more likely to experience sputum - 7 times more likely to experience nasal congestion - and 1 times more likely to experience diarrhea

#>   
#> Call:  
#> glm(formula = hypertension ~ muscle\_ache + sputum + chills +   
#> nasal\_congestion + temperature + diarrhoea + loss\_smell\_taste +   
#> cough + age\_band + Gender, family = "binomial", data = hypertension\_data)  
#>   
#> Deviance Residuals:   
#> Min 1Q Median 3Q Max   
#> -1.1122 -0.5602 -0.3806 -0.2578 2.8076   
#>   
#> Coefficients:  
#> Estimate Std. Error z value Pr(>|z|)   
#> (Intercept) -3.92164 0.13023 -30.114 < 2e-16 \*\*\*  
#> muscle\_acheYes 0.16033 0.03277 4.892 9.99e-07 \*\*\*  
#> sputumYes 0.11128 0.03353 3.319 0.000903 \*\*\*  
#> chillsYes -0.15492 0.05330 -2.907 0.003655 \*\*   
#> nasal\_congestionYes 0.07135 0.03416 2.089 0.036738 \*   
#> temperature37.5-38 -0.06586 0.05409 -1.218 0.223314   
#> temperature38.1-39 0.24207 0.11350 2.133 0.032940 \*   
#> temperature39.1-41 0.31329 0.25758 1.216 0.223867   
#> diarrhoeaYes 0.09886 0.05098 1.939 0.052465 .   
#> loss\_smell\_tasteYes -0.09650 0.05470 -1.764 0.077681 .   
#> coughYes 0.05568 0.03243 1.717 0.085985 .   
#> age\_band21-30 0.31828 0.13428 2.370 0.017774 \*   
#> age\_band31-40 1.22178 0.13066 9.351 < 2e-16 \*\*\*  
#> age\_band41-50 2.03207 0.13063 15.555 < 2e-16 \*\*\*  
#> age\_band51-60 2.44935 0.13107 18.688 < 2e-16 \*\*\*  
#> age\_band61-70 2.62456 0.13361 19.644 < 2e-16 \*\*\*  
#> age\_band71-80 2.89371 0.14591 19.832 < 2e-16 \*\*\*  
#> age\_band81-100 3.00462 0.25442 11.810 < 2e-16 \*\*\*  
#> GenderMale 0.35927 0.02730 13.162 < 2e-16 \*\*\*  
#> GenderOther 0.61793 0.23686 2.609 0.009084 \*\*   
#> ---  
#> Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
#>   
#> (Dispersion parameter for binomial family taken to be 1)  
#>   
#> Null deviance: 43457 on 60683 degrees of freedom  
#> Residual deviance: 39439 on 60664 degrees of freedom  
#> AIC: 39479  
#>   
#> Number of Fisher Scoring iterations: 6

#> (Intercept) muscle\_acheYes sputumYes chillsYes   
#> -98.019142 17.389692 11.770485 -14.351676   
#> nasal\_congestionYes temperature37.5-38 temperature38.1-39 temperature39.1-41   
#> 7.396175 -6.374267 27.388545 36.792359   
#> diarrhoeaYes loss\_smell\_tasteYes coughYes age\_band21-30   
#> 10.391434 -9.198913 5.726360 37.476477   
#> age\_band31-40 age\_band41-50 age\_band51-60 age\_band61-70   
#> 239.323841 662.990022 1058.081791 1279.855228   
#> age\_band71-80 age\_band81-100 GenderMale GenderOther   
#> 1706.026160 1917.860777 43.228571 85.507939

Confidence intervals for hypertension model

#> 2.5 % 97.5 %  
#> (Intercept) -4.186851815 -3.675522245  
#> muscle\_acheYes 0.095909488 0.224389091  
#> sputumYes 0.045420945 0.176847360  
#> chillsYes -0.260140483 -0.051177496  
#> nasal\_congestionYes 0.004162389 0.138085514  
#> temperature37.5-38 -0.172882052 0.039175988  
#> temperature38.1-39 0.015106615 0.460410754  
#> temperature39.1-41 -0.217221231 0.797524749  
#> diarrhoeaYes -0.001838618 0.198023949  
#> loss\_smell\_tasteYes -0.204599676 0.009837472  
#> coughYes -0.008015924 0.119118647  
#> age\_band21-30 0.063526383 0.590783096  
#> age\_band31-40 0.974712125 1.487757277  
#> age\_band41-50 1.785063569 2.298002028  
#> age\_band51-60 2.201427338 2.716066122  
#> age\_band61-70 2.371281592 2.895889521  
#> age\_band71-80 2.614631891 3.187489985  
#> age\_band81-100 2.500059835 3.500215348  
#> GenderMale 0.305852507 0.412853115  
#> GenderOther 0.130548468 1.062991683

#> 2.5 % 97.5 %  
#> (Intercept) 0.01519404 0.02533617  
#> muscle\_acheYes 1.10065944 1.25155790  
#> sputumYes 1.04646827 1.19344891  
#> chillsYes 0.77094327 0.95011002  
#> nasal\_congestionYes 1.00417106 1.14807372  
#> temperature37.5-38 0.84123683 1.03995349  
#> temperature38.1-39 1.01522130 1.58472478  
#> temperature39.1-41 0.80475191 2.22003897  
#> diarrhoeaYes 0.99816307 1.21899159  
#> loss\_smell\_tasteYes 0.81497350 1.00988602  
#> coughYes 0.99201612 1.12650357  
#> age\_band21-30 1.06558760 1.80540167  
#> age\_band31-40 2.65040411 4.42715549  
#> age\_band41-50 5.95995880 9.95427421  
#> age\_band51-60 9.03790444 15.12072201  
#> age\_band61-70 10.71111076 18.09959425  
#> age\_band71-80 13.66218628 24.22753957  
#> age\_band81-100 12.18322292 33.12258409  
#> GenderMale 1.35778203 1.51112305  
#> GenderOther 1.13945317 2.89501903

# Heart disease

Sixth question is what are the Covid-19 symptoms respondents with heart disease are experiencing?

When adjusting for all variables, for the heart disease group, results show strong evidenceof association: - of Covid-19 symptoms such as shortness of breath, muscle ache, temperature (p≤0.05) - and other symptoms such as chills and nausea and vomiting for respondents with heart disease

Respondents with heart disease are: - 6 times more likely to experience shortness of breath - almost 2 times more likely to experience muscle ache - almost 2 times more likely to have 37.5-38 temperature - 7 times more likely to experience 38.1-39 temperature - 2 times more likely to show 39.1-40 in temperature rise - 5 times more likely to experience chills - 6 times more likely to experience nausea and vomiting

#>   
#> Call:  
#> glm(formula = heart\_disease ~ shortness\_breath + muscle\_ache +   
#> temperature + chills + nausea\_vomiting + headache + age\_band +   
#> Gender, family = "binomial", data = heart\_data)  
#>   
#> Deviance Residuals:   
#> Min 1Q Median 3Q Max   
#> -0.9641 -0.1416 -0.1082 -0.0873 3.5328   
#>   
#> Coefficients:  
#> Estimate Std. Error z value Pr(>|z|)   
#> (Intercept) -6.23833 0.34401 -18.134 < 2e-16 \*\*\*  
#> shortness\_breathYes 0.47200 0.10136 4.657 3.22e-06 \*\*\*  
#> muscle\_acheYes 0.17693 0.10170 1.740 0.08191 .   
#> temperature37.5-38 0.01574 0.15190 0.104 0.91746   
#> temperature38.1-39 0.06970 0.30933 0.225 0.82174   
#> temperature39.1-41 1.22573 0.41567 2.949 0.00319 \*\*   
#> chillsYes 0.39977 0.13628 2.934 0.00335 \*\*   
#> nausea\_vomitingYes 0.45286 0.18609 2.434 0.01495 \*   
#> headacheYes -0.27198 0.11448 -2.376 0.01751 \*   
#> age\_band21-30 0.21549 0.35385 0.609 0.54253   
#> age\_band31-40 0.43035 0.34963 1.231 0.21837   
#> age\_band41-50 0.96932 0.35068 2.764 0.00571 \*\*   
#> age\_band51-60 1.83132 0.34545 5.301 1.15e-07 \*\*\*  
#> age\_band61-70 2.66507 0.34499 7.725 1.12e-14 \*\*\*  
#> age\_band71-80 3.25814 0.35621 9.147 < 2e-16 \*\*\*  
#> age\_band81-100 2.93667 0.54149 5.423 5.85e-08 \*\*\*  
#> GenderMale 0.67110 0.08490 7.905 2.69e-15 \*\*\*  
#> GenderOther 0.86931 0.60856 1.428 0.15316   
#> ---  
#> Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
#>   
#> (Dispersion parameter for binomial family taken to be 1)  
#>   
#> Null deviance: 7433.7 on 60683 degrees of freedom  
#> Residual deviance: 6680.3 on 60666 degrees of freedom  
#> AIC: 6716.3  
#>   
#> Number of Fisher Scoring iterations: 8

#> (Intercept) shortness\_breathYes muscle\_acheYes temperature37.5-38   
#> -99.804688 60.320170 19.355226 1.586628   
#> temperature38.1-39 temperature39.1-41 chillsYes nausea\_vomitingYes   
#> 7.218118 240.664033 49.148903 57.280422   
#> headacheYes age\_band21-30 age\_band31-40 age\_band41-50   
#> -23.812674 24.047080 53.779380 163.616025   
#> age\_band51-60 age\_band61-70 age\_band71-80 age\_band81-100   
#> 524.209383 1336.895993 2500.101024 1785.298189   
#> GenderMale GenderOther   
#> 95.638086 138.527094

Confidence Intervals for heart disease model

#> 2.5 % 97.5 %  
#> (Intercept) -6.98826620 -5.62414540  
#> shortness\_breathYes 0.27082787 0.66836174  
#> muscle\_acheYes -0.02467548 0.37413530  
#> temperature37.5-38 -0.29228282 0.30419049  
#> temperature38.1-39 -0.58901532 0.63363932  
#> temperature39.1-41 0.32156559 1.97332827  
#> chillsYes 0.12772437 0.66228877  
#> nausea\_vomitingYes 0.07311334 0.80434382  
#> headacheYes -0.49962853 -0.05067299  
#> age\_band21-30 -0.42323583 0.98041906  
#> age\_band31-40 -0.19808040 1.18875293  
#> age\_band41-50 0.33836080 1.72935897  
#> age\_band51-60 1.21307811 2.58323070  
#> age\_band61-70 2.04797213 3.41628341  
#> age\_band71-80 2.61402643 4.02688572  
#> age\_band81-100 1.81901307 3.98537359  
#> GenderMale 0.50606944 0.83902992  
#> GenderOther -0.56649345 1.89855112

Put the coefficients and confidence intervals onto a useful scale

#> 2.5 % 97.5 %  
#> (Intercept) 9.226448e-04 0.003609647  
#> shortness\_breathYes 1.311049e+00 1.951038386  
#> muscle\_acheYes 9.756265e-01 1.453733823  
#> temperature37.5-38 7.465574e-01 1.355527243  
#> temperature38.1-39 5.548734e-01 1.884456252  
#> temperature39.1-41 1.379285e+00 7.194582181  
#> chillsYes 1.136240e+00 1.939225694  
#> nausea\_vomitingYes 1.075852e+00 2.235229308  
#> headacheYes 6.067560e-01 0.950589475  
#> age\_band21-30 6.549242e-01 2.665573033  
#> age\_band31-40 8.203039e-01 3.282984543  
#> age\_band41-50 1.402646e+00 5.637039214  
#> age\_band51-60 3.363823e+00 13.239843155  
#> age\_band61-70 7.752165e+00 30.456011926  
#> age\_band71-80 1.365392e+01 56.085971740  
#> age\_band81-100 6.165770e+00 53.805386677  
#> GenderMale 1.658759e+00 2.314121007  
#> GenderOther 5.675120e-01 6.676214406

# Lung disease

Seventh question is what are the Covid-19 symptoms respondents with lung disease experience?

When adjusting for all variables, for respondents with lung diseases, results reveal strong evidence of associations: - of Covid-19 symptoms such as shorthness of breath, musce ache and cough (p≤0.001) - as well as nausea and vomiting (p≤0.01)

Moreover, patients with lung condition are: - 1 time more likely to experience shortness of breath - 3 times more likely to experience muscle ache - 2 times more likely to experience cough  
- 8 times more likely to experience temperature between 37.5 - 38 - 7 times more likely to experience temperature between 39.1 - 41 - almost 8 times more likely to experience sputum - 4 times more likely to experience nausea and vomiting

#>   
#> Call:  
#> glm(formula = lung\_condition ~ shortness\_breath + muscle\_ache +   
#> cough + sputum + temperature + sore\_throat + nausea\_vomiting +   
#> headache + age\_band + Gender, family = "binomial", data = lungc\_data)  
#>   
#> Deviance Residuals:   
#> Min 1Q Median 3Q Max   
#> -0.9205 -0.1928 -0.1459 -0.1233 3.3893   
#>   
#> Coefficients:  
#> Estimate Std. Error z value Pr(>|z|)   
#> (Intercept) -5.03660 0.19286 -26.116 < 2e-16 \*\*\*  
#> shortness\_breathYes 0.89241 0.07369 12.111 < 2e-16 \*\*\*  
#> muscle\_acheYes 0.25660 0.07674 3.344 0.000827 \*\*\*  
#> coughYes 0.22031 0.07468 2.950 0.003175 \*\*   
#> sputumYes 0.56203 0.07405 7.590 3.21e-14 \*\*\*  
#> temperature37.5-38 0.07686 0.11092 0.693 0.488356   
#> temperature38.1-39 -0.67670 0.34298 -1.973 0.048497 \*   
#> temperature39.1-41 0.56975 0.43568 1.308 0.190958   
#> sore\_throatYes -0.17875 0.07374 -2.424 0.015346 \*   
#> nausea\_vomitingYes 0.30188 0.13983 2.159 0.030854 \*   
#> headacheYes -0.14263 0.08236 -1.732 0.083300 .   
#> age\_band21-30 0.09085 0.19334 0.470 0.638439   
#> age\_band31-40 0.16168 0.19240 0.840 0.400719   
#> age\_band41-50 -0.10598 0.20560 -0.515 0.606214   
#> age\_band51-60 0.50441 0.20152 2.503 0.012315 \*   
#> age\_band61-70 1.34340 0.20089 6.687 2.27e-11 \*\*\*  
#> age\_band71-80 1.91554 0.22183 8.635 < 2e-16 \*\*\*  
#> age\_band81-100 1.51335 0.50058 3.023 0.002501 \*\*   
#> GenderMale 0.22152 0.06630 3.341 0.000834 \*\*\*  
#> GenderOther 0.39138 0.51851 0.755 0.450362   
#> ---  
#> Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
#>   
#> (Dispersion parameter for binomial family taken to be 1)  
#>   
#> Null deviance: 10300.9 on 60683 degrees of freedom  
#> Residual deviance: 9648.1 on 60664 degrees of freedom  
#> AIC: 9688.1  
#>   
#> Number of Fisher Scoring iterations: 7

#> (Intercept) shortness\_breathYes muscle\_acheYes coughYes   
#> -99.350420 144.099346 29.252456 24.646571   
#> sputumYes temperature37.5-38 temperature38.1-39 temperature39.1-41   
#> 75.422426 7.989092 -49.170719 76.783205   
#> sore\_throatYes nausea\_vomitingYes headacheYes age\_band21-30   
#> -16.368855 35.239703 -13.292414 9.510280   
#> age\_band31-40 age\_band41-50 age\_band51-60 age\_band61-70   
#> 17.548227 -10.056162 65.601151 283.206800   
#> age\_band71-80 age\_band81-100 GenderMale GenderOther   
#> 579.058147 354.192999 24.797280 47.902224

Confidence intervals for lung disease

#> 2.5 % 97.5 %  
#> (Intercept) -5.43407225 -4.67570039  
#> shortness\_breathYes 0.74738679 1.03629789  
#> muscle\_acheYes 0.10531076 0.40620521  
#> coughYes 0.07360337 0.36637583  
#> sputumYes 0.41657013 0.70689380  
#> temperature37.5-38 -0.14579349 0.28942163  
#> temperature38.1-39 -1.42491038 -0.06471730  
#> temperature39.1-41 -0.39506293 1.34117882  
#> sore\_throatYes -0.32432733 -0.03518400  
#> nausea\_vomitingYes 0.01891607 0.56785580  
#> headacheYes -0.30544753 0.01747508  
#> age\_band21-30 -0.27179674 0.48869355  
#> age\_band31-40 -0.19886491 0.55789938  
#> age\_band41-50 -0.49573825 0.31305950  
#> age\_band51-60 0.12376060 0.91645868  
#> age\_band61-70 0.96424566 1.75441777  
#> age\_band71-80 1.49028792 2.36293700  
#> age\_band81-100 0.41011193 2.41267471  
#> GenderMale 0.09200202 0.35196993  
#> GenderOther -0.80490800 1.28088001

#> 2.5 % 97.5 %  
#> (Intercept) 0.004365283 0.009318996  
#> shortness\_breathYes 2.111475071 2.818762314  
#> muscle\_acheYes 1.111055823 1.501110566  
#> coughYes 1.076379792 1.442497272  
#> sputumYes 1.516750360 2.027683086  
#> temperature37.5-38 0.864336182 1.335654769  
#> temperature38.1-39 0.240530019 0.937332413  
#> temperature39.1-41 0.673637646 3.823548141  
#> sore\_throatYes 0.723013538 0.965427761  
#> nausea\_vomitingYes 1.019096110 1.764479593  
#> headacheYes 0.736793565 1.017628666  
#> age\_band21-30 0.762009131 1.630185072  
#> age\_band31-40 0.819660611 1.746998867  
#> age\_band41-50 0.609121055 1.367602897  
#> age\_band51-60 1.131744895 2.500419910  
#> age\_band61-70 2.622808429 5.780081444  
#> age\_band71-80 4.438373250 10.622102827  
#> age\_band81-100 1.506986453 11.163781097  
#> GenderMale 1.096367041 1.421865774  
#> GenderOther 0.447129059 3.599806194

#Liver disease

Eighth question is what are the Covid-19 symptos patients with liver disease are experiencing?

When adjusting for all variables, for the liver disease group, results reveal strong evidence: - of association of Covid-19 symptoms such as muscle ache and temperature (p≤0.001) - as well as other symptoms sch as nausea, chills and sputum (p≤0.001)

This group is: - 8 times more likely to experience muscle ache - almost 3 times more likely to experience increase in 37.5 -38 temperature - 4 times more likely increase in 38.1 -39 temperature - 3 times more likely increase in 39.1-41 temperature - is 2 times more likely to experience nausea and vomiting - is almost 5 times to more likely to experience sputum - almost 5 times more likely to experience chills

#>   
#> Call:  
#> glm(formula = liver\_disease ~ muscle\_ache + temperature + nausea\_vomiting +   
#> chills + sputum + age\_band + Gender, family = "binomial",   
#> data = liver\_data)  
#>   
#> Deviance Residuals:   
#> Min 1Q Median 3Q Max   
#> -0.6470 -0.1158 -0.0960 -0.0802 3.5808   
#>   
#> Coefficients:  
#> Estimate Std. Error z value Pr(>|z|)   
#> (Intercept) -6.6563 0.3739 -17.802 < 2e-16 \*\*\*  
#> muscle\_acheYes 0.5887 0.1210 4.867 1.13e-06 \*\*\*  
#> temperature37.5-38 0.2470 0.1708 1.446 0.148193   
#> temperature38.1-39 0.3495 0.3378 1.034 0.300914   
#> temperature39.1-41 1.4198 0.4469 3.177 0.001488 \*\*   
#> nausea\_vomitingYes 1.0011 0.1833 5.460 4.75e-08 \*\*\*  
#> chillsYes 0.3868 0.1629 2.375 0.017546 \*   
#> sputumYes 0.2558 0.1177 2.174 0.029735 \*   
#> age\_band21-30 0.3304 0.3768 0.877 0.380547   
#> age\_band31-40 0.6908 0.3706 1.864 0.062338 .   
#> age\_band41-50 1.0501 0.3741 2.807 0.005004 \*\*   
#> age\_band51-60 0.6566 0.3926 1.673 0.094410 .   
#> age\_band61-70 0.7816 0.4199 1.861 0.062683 .   
#> age\_band71-80 1.5466 0.4617 3.350 0.000808 \*\*\*  
#> age\_band81-100 2.1043 0.8034 2.619 0.008813 \*\*   
#> GenderMale 0.6170 0.1177 5.242 1.58e-07 \*\*\*  
#> GenderOther 1.0292 0.7263 1.417 0.156454   
#> ---  
#> Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
#>   
#> (Dispersion parameter for binomial family taken to be 1)  
#>   
#> Null deviance: 4265.6 on 60683 degrees of freedom  
#> Residual deviance: 4092.5 on 60667 degrees of freedom  
#> AIC: 4126.5  
#>   
#> Number of Fisher Scoring iterations: 8

#> (Intercept) muscle\_acheYes temperature37.5-38 temperature38.1-39   
#> -99.87141 80.16830 28.01704 41.83033   
#> temperature39.1-41 nausea\_vomitingYes chillsYes sputumYes   
#> 313.64546 172.13240 47.23093 29.14541   
#> age\_band21-30 age\_band31-40 age\_band41-50 age\_band51-60   
#> 39.14865 99.53895 185.77963 92.82099   
#> age\_band61-70 age\_band71-80 age\_band81-100 GenderMale   
#> 118.48954 369.54950 720.16441 85.33451   
#> GenderOther   
#> 179.87500

Confidence intervals for liver disease model

#> 2.5 % 97.5 %  
#> (Intercept) -7.472158947 -5.9882434  
#> muscle\_acheYes 0.349639926 0.8241103  
#> temperature37.5-38 -0.099461165 0.5715027  
#> temperature38.1-39 -0.376490440 0.9611205  
#> temperature39.1-41 0.437753178 2.2178358  
#> nausea\_vomitingYes 0.629081527 1.3492735  
#> chillsYes 0.060664912 0.6997870  
#> sputumYes 0.022470272 0.4841484  
#> age\_band21-30 -0.346862594 1.1495821  
#> age\_band31-40 0.028699152 1.5007207  
#> age\_band41-50 0.379391022 1.8652456  
#> age\_band51-60 -0.059624556 1.4999818  
#> age\_band61-70 -0.003477877 1.6660851  
#> age\_band71-80 0.653861577 2.4931554  
#> age\_band81-100 0.196501858 3.5186265  
#> GenderMale 0.389128800 0.8509628  
#> GenderOther -0.788555499 2.2092983

#> 2.5 % 97.5 %  
#> (Intercept) 0.0005686992 0.002508066  
#> muscle\_acheYes 1.4185566715 2.279851579  
#> temperature37.5-38 0.9053251078 1.770926216  
#> temperature38.1-39 0.6862656781 2.614624585  
#> temperature39.1-41 1.5492224774 9.187426173  
#> nausea\_vomitingYes 1.8758868368 3.854624051  
#> chillsYes 1.0625428088 2.013323725  
#> sputumYes 1.0227246297 1.622792411  
#> age\_band21-30 0.7069024539 3.156873395  
#> age\_band31-40 1.0291149411 4.484920123  
#> age\_band41-50 1.4613943618 6.457521773  
#> age\_band51-60 0.9421181797 4.481607354  
#> age\_band61-70 0.9965281640 5.291412055  
#> age\_band71-80 1.9229521378 12.099393798  
#> age\_band81-100 1.2171375829 33.738057551  
#> GenderMale 1.4756946086 2.341900497  
#> GenderOther 0.4545008484 9.109322387

# Kidney disease

And finaly, the ninth question is what are the symptoms kidney disease patients are experiencing?

When adjusting for all variables, for respondets with kidney disease, results show strong evidence of associations of: - Covid-19 symptoms (loss of smell and test, cough muscle ache, shortness of breath and temperature (p≤0.05)) - and other symptoms such as sore throat

Patients with kidney disease are:

* 1 time more likely to experience loss of smell and taste
* almost 3 times more likely to experience shortness of breath
* 3 times more likely to experience muscle ache
* almost 4 times likely to experience cough
* almost 8 times to experience 37.5-38 temperature increase
* 7 times more likely to experience 38.1-29 temperature increase
* 4 times more likely to experience 39.1-41 temperature increase4
* 2 times more likely to expereince sore throat

#>   
#> Call:  
#> glm(formula = kidney\_disease ~ loss\_smell\_taste + cough + muscle\_ache +   
#> shortness\_breath + temperature + chills + sore\_throat + age\_band +   
#> Gender, family = "binomial", data = kidney\_data)  
#>   
#> Deviance Residuals:   
#> Min 1Q Median 3Q Max   
#> -0.6010 -0.1032 -0.0877 -0.0771 3.5377   
#>   
#> Coefficients:  
#> Estimate Std. Error z value Pr(>|z|)   
#> (Intercept) -6.38572 0.37426 -17.062 < 2e-16 \*\*\*  
#> loss\_smell\_tasteYes 0.77103 0.17254 4.469 7.87e-06 \*\*\*  
#> coughYes 0.32543 0.12720 2.558 0.010512 \*   
#> muscle\_acheYes 0.27121 0.13845 1.959 0.050124 .   
#> shortness\_breathYes 0.25660 0.14690 1.747 0.080674 .   
#> temperature37.5-38 0.08144 0.20552 0.396 0.691907   
#> temperature38.1-39 0.53416 0.37771 1.414 0.157309   
#> temperature39.1-41 1.57610 0.53107 2.968 0.002999 \*\*   
#> chillsYes -0.44000 0.22232 -1.979 0.047801 \*   
#> sore\_throatYes 0.19823 0.12860 1.541 0.123217   
#> age\_band21-30 0.37167 0.37339 0.995 0.319538   
#> age\_band31-40 0.20798 0.37560 0.554 0.579760   
#> age\_band41-50 0.42641 0.38390 1.111 0.266683   
#> age\_band51-60 0.68265 0.38809 1.759 0.078574 .   
#> age\_band61-70 0.93925 0.40770 2.304 0.021236 \*   
#> age\_band71-80 1.80720 0.43714 4.134 3.56e-05 \*\*\*  
#> age\_band81-100 2.43091 0.69074 3.519 0.000433 \*\*\*  
#> GenderMale 0.36191 0.12269 2.950 0.003180 \*\*   
#> GenderOther 0.37432 1.01224 0.370 0.711536   
#> ---  
#> Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
#>   
#> (Dispersion parameter for binomial family taken to be 1)  
#>   
#> Null deviance: 3731.2 on 60683 degrees of freedom  
#> Residual deviance: 3625.0 on 60665 degrees of freedom  
#> AIC: 3663  
#>   
#> Number of Fisher Scoring iterations: 8

#> (Intercept) loss\_smell\_tasteYes coughYes muscle\_acheYes   
#> -99.831455 116.198176 38.463264 31.155391   
#> shortness\_breathYes temperature37.5-38 temperature38.1-39 temperature39.1-41   
#> 29.253423 8.485077 70.600660 383.607834   
#> chillsYes sore\_throatYes age\_band21-30 age\_band31-40   
#> -35.596068 21.923933 45.015450 23.119207   
#> age\_band41-50 age\_band51-60 age\_band61-70 age\_band71-80   
#> 53.175433 97.912395 155.805059 509.339144   
#> age\_band81-100 GenderMale GenderOther   
#> 1036.926891 43.607545 45.400158

Confidence intervals for kidney disease

#> 2.5 % 97.5 %  
#> (Intercept) -7.201861919 -5.71637667  
#> loss\_smell\_tasteYes 0.422649398 1.10010911  
#> coughYes 0.074151333 0.57320367  
#> muscle\_acheYes -0.004005916 0.53921080  
#> shortness\_breathYes -0.036640274 0.53984593  
#> temperature37.5-38 -0.340954430 0.46737769  
#> temperature38.1-39 -0.287212455 1.21198192  
#> temperature39.1-41 0.362000966 2.49715415  
#> chillsYes -0.892731111 -0.01910726  
#> sore\_throatYes -0.056263748 0.44832018  
#> age\_band21-30 -0.297799167 1.18542129  
#> age\_band31-40 -0.466891741 1.02514471  
#> age\_band41-50 -0.269042678 1.25621589  
#> age\_band51-60 -0.023096933 1.51886665  
#> age\_band61-70 0.184442330 1.80514696  
#> age\_band71-80 0.977576228 2.71714478  
#> age\_band81-100 0.892033899 3.70116770  
#> GenderMale 0.123505091 0.60499041  
#> GenderOther -2.501639967 1.89614029

#> 2.5 % 97.5 %  
#> (Intercept) 0.000745197 0.003291616  
#> loss\_smell\_tasteYes 1.525999184 3.004493816  
#> coughYes 1.076969774 1.773941085  
#> muscle\_acheYes 0.996002097 1.714653131  
#> shortness\_breathYes 0.964022857 1.715742498  
#> temperature37.5-38 0.711091312 1.595804014  
#> temperature38.1-39 0.750352296 3.360137595  
#> temperature39.1-41 1.436200329 12.147873713  
#> chillsYes 0.409535736 0.981074126  
#> sore\_throatYes 0.945289784 1.565679921  
#> age\_band21-30 0.742450433 3.272065019  
#> age\_band31-40 0.626947959 2.787498807  
#> age\_band41-50 0.764110644 3.512106122  
#> age\_band51-60 0.977167760 4.567046220  
#> age\_band61-70 1.202547629 6.080865014  
#> age\_band71-80 2.658006027 15.137040842  
#> age\_band81-100 2.440087499 40.494562343  
#> GenderMale 1.131455765 1.831234644  
#> GenderOther 0.081950492 6.660138573

## Appendices

# Stepwise model

Obesity

#> Start: AIC=36759.45  
#> obesity ~ 1  
#>   
#> Df Deviance AIC  
#> + muscle\_ache 1 36616 36620  
#> + sputum 1 36669 36673  
#> + age\_band 7 36668 36684  
#> + Gender 2 36678 36684  
#> + shortness\_breath 1 36713 36717  
#> + headache 1 36714 36718  
#> + diarrhoea 1 36720 36724  
#> + cough 1 36726 36730  
#> + sore\_throat 1 36742 36746  
#> + nasal\_congestion 1 36742 36746  
#> + chills 1 36744 36748  
#> + nausea\_vomiting 1 36751 36755  
#> + temperature 3 36749 36757  
#> + loss\_smell\_taste 1 36754 36758  
#> <none> 36757 36759  
#>   
#> Step: AIC=36619.66  
#> obesity ~ muscle\_ache  
#>   
#> Df Deviance AIC  
#> + age\_band 7 36527 36545  
#> + Gender 2 36549 36557  
#> + sputum 1 36556 36562  
#> + diarrhoea 1 36600 36606  
#> + cough 1 36600 36606  
#> + shortness\_breath 1 36601 36607  
#> + headache 1 36609 36615  
#> + temperature 3 36607 36617  
#> + nasal\_congestion 1 36612 36618  
#> + sore\_throat 1 36613 36619  
#> <none> 36616 36620  
#> + nausea\_vomiting 1 36614 36620  
#> + chills 1 36616 36622  
#> + loss\_smell\_taste 1 36616 36622  
#>   
#> Step: AIC=36544.88  
#> obesity ~ muscle\_ache + age\_band  
#>   
#> Df Deviance AIC  
#> + Gender 2 36463 36485  
#> + sputum 1 36468 36488  
#> + shortness\_breath 1 36508 36528  
#> + cough 1 36508 36528  
#> + diarrhoea 1 36510 36530  
#> + headache 1 36519 36539  
#> + nasal\_congestion 1 36522 36542  
#> + temperature 3 36519 36543  
#> + sore\_throat 1 36524 36544  
#> + nausea\_vomiting 1 36525 36545  
#> <none> 36527 36545  
#> + loss\_smell\_taste 1 36527 36547  
#> + chills 1 36527 36547  
#>   
#> Step: AIC=36484.75  
#> obesity ~ muscle\_ache + age\_band + Gender  
#>   
#> Df Deviance AIC  
#> + sputum 1 36403 36427  
#> + shortness\_breath 1 36445 36469  
#> + cough 1 36445 36469  
#> + diarrhoea 1 36447 36471  
#> + nasal\_congestion 1 36455 36479  
#> + headache 1 36458 36482  
#> + sore\_throat 1 36459 36483  
#> + temperature 3 36456 36484  
#> <none> 36463 36485  
#> + nausea\_vomiting 1 36461 36485  
#> + loss\_smell\_taste 1 36462 36486  
#> + chills 1 36463 36487  
#>   
#> Step: AIC=36426.57  
#> obesity ~ muscle\_ache + age\_band + Gender + sputum  
#>   
#> Df Deviance AIC  
#> + diarrhoea 1 36390 36416  
#> + shortness\_breath 1 36394 36420  
#> + temperature 3 36395 36425  
#> + headache 1 36400 36426  
#> <none> 36403 36427  
#> + nasal\_congestion 1 36401 36427  
#> + loss\_smell\_taste 1 36401 36427  
#> + cough 1 36401 36427  
#> + sore\_throat 1 36402 36428  
#> + nausea\_vomiting 1 36402 36428  
#> + chills 1 36402 36428  
#>   
#> Step: AIC=36416.1  
#> obesity ~ muscle\_ache + age\_band + Gender + sputum + diarrhoea  
#>   
#> Df Deviance AIC  
#> + shortness\_breath 1 36384 36412  
#> + temperature 3 36382 36414  
#> + loss\_smell\_taste 1 36387 36415  
#> <none> 36390 36416  
#> + headache 1 36389 36417  
#> + nasal\_congestion 1 36389 36417  
#> + chills 1 36389 36417  
#> + cough 1 36389 36417  
#> + sore\_throat 1 36390 36418  
#> + nausea\_vomiting 1 36390 36418  
#>   
#> Step: AIC=36411.96  
#> obesity ~ muscle\_ache + age\_band + Gender + sputum + diarrhoea +   
#> shortness\_breath  
#>   
#> Df Deviance AIC  
#> + loss\_smell\_taste 1 36380 36410  
#> + temperature 3 36376 36410  
#> <none> 36384 36412  
#> + chills 1 36382 36412  
#> + headache 1 36383 36413  
#> + nasal\_congestion 1 36383 36413  
#> + cough 1 36383 36413  
#> + sore\_throat 1 36384 36414  
#> + nausea\_vomiting 1 36384 36414  
#>   
#> Step: AIC=36409.82  
#> obesity ~ muscle\_ache + age\_band + Gender + sputum + diarrhoea +   
#> shortness\_breath + loss\_smell\_taste  
#>   
#> Df Deviance AIC  
#> + temperature 3 36372 36408  
#> <none> 36380 36410  
#> + headache 1 36378 36410  
#> + nasal\_congestion 1 36379 36411  
#> + chills 1 36379 36411  
#> + cough 1 36379 36411  
#> + sore\_throat 1 36380 36412  
#> + nausea\_vomiting 1 36380 36412  
#>   
#> Step: AIC=36408.36  
#> obesity ~ muscle\_ache + age\_band + Gender + sputum + diarrhoea +   
#> shortness\_breath + loss\_smell\_taste + temperature  
#>   
#> Df Deviance AIC  
#> <none> 36372 36408  
#> + headache 1 36371 36409  
#> + nasal\_congestion 1 36371 36409  
#> + cough 1 36372 36410  
#> + chills 1 36372 36410  
#> + sore\_throat 1 36372 36410  
#> + nausea\_vomiting 1 36372 36410

Obesity summary model

#>   
#> Call:  
#> glm(formula = obesity ~ muscle\_ache + age\_band + Gender + sputum +   
#> diarrhoea + shortness\_breath + loss\_smell\_taste + temperature,   
#> family = "binomial", data = obesity\_data)  
#>   
#> Deviance Residuals:   
#> Min 1Q Median 3Q Max   
#> -0.7087 -0.4553 -0.4092 -0.3851 2.4884   
#>   
#> Coefficients:  
#> Estimate Std. Error z value Pr(>|z|)   
#> (Intercept) -2.69971 0.08632 -31.277 < 2e-16 \*\*\*  
#> muscle\_acheYes 0.29262 0.03323 8.806 < 2e-16 \*\*\*  
#> age\_band21-30 0.19722 0.08837 2.232 0.025629 \*   
#> age\_band31-40 0.41318 0.08741 4.727 2.28e-06 \*\*\*  
#> age\_band41-50 0.48528 0.08976 5.407 6.42e-08 \*\*\*  
#> age\_band51-60 0.45104 0.09239 4.882 1.05e-06 \*\*\*  
#> age\_band61-70 0.26918 0.10302 2.613 0.008981 \*\*   
#> age\_band71-80 0.02139 0.15440 0.139 0.889830   
#> age\_band81-100 0.45705 0.36205 1.262 0.206812   
#> GenderMale -0.22825 0.02870 -7.953 1.82e-15 \*\*\*  
#> GenderOther 0.12153 0.25168 0.483 0.629186   
#> sputumYes 0.23244 0.03232 7.191 6.44e-13 \*\*\*  
#> diarrhoeaYes 0.18403 0.05090 3.616 0.000299 \*\*\*  
#> shortness\_breathYes 0.10182 0.03787 2.688 0.007178 \*\*   
#> loss\_smell\_tasteYes -0.10956 0.05671 -1.932 0.053361 .   
#> temperature37.5-38 -0.12196 0.05503 -2.216 0.026665 \*   
#> temperature38.1-39 0.13748 0.11732 1.172 0.241237   
#> temperature39.1-41 0.22209 0.27026 0.822 0.411205   
#> ---  
#> Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
#>   
#> (Dispersion parameter for binomial family taken to be 1)  
#>   
#> Null deviance: 36757 on 60683 degrees of freedom  
#> Residual deviance: 36372 on 60666 degrees of freedom  
#> AIC: 36408  
#>   
#> Number of Fisher Scoring iterations: 5

Asthma

#> Start: AIC=23004.68  
#> asthma ~ 1  
#>   
#> Df Deviance AIC  
#> + shortness\_breath 1 22377 22381  
#> + Gender 2 22664 22670  
#> + age\_band 7 22810 22826  
#> + sputum 1 22876 22880  
#> + cough 1 22949 22953  
#> + muscle\_ache 1 22950 22954  
#> + chills 1 22959 22963  
#> + headache 1 22972 22976  
#> + loss\_smell\_taste 1 22977 22981  
#> + diarrhoea 1 22984 22988  
#> + nasal\_congestion 1 22984 22988  
#> + nausea\_vomiting 1 22988 22992  
#> + temperature 3 22994 23002  
#> + sore\_throat 1 23000 23004  
#> <none> 23003 23005  
#>   
#> Step: AIC=22381.14  
#> asthma ~ shortness\_breath  
#>   
#> Df Deviance AIC  
#> + Gender 2 22054 22062  
#> + age\_band 7 22142 22160  
#> + sputum 1 22342 22348  
#> + sore\_throat 1 22347 22353  
#> + temperature 3 22366 22376  
#> + chills 1 22374 22380  
#> + cough 1 22374 22380  
#> + nasal\_congestion 1 22375 22381  
#> <none> 22377 22381  
#> + loss\_smell\_taste 1 22376 22382  
#> + nausea\_vomiting 1 22376 22382  
#> + headache 1 22377 22383  
#> + muscle\_ache 1 22377 22383  
#> + diarrhoea 1 22377 22383  
#>   
#> Step: AIC=22061.78  
#> asthma ~ shortness\_breath + Gender  
#>   
#> Df Deviance AIC  
#> + age\_band 7 21866 21888  
#> + sputum 1 22018 22028  
#> + sore\_throat 1 22026 22036  
#> + temperature 3 22045 22059  
#> <none> 22054 22062  
#> + cough 1 22052 22062  
#> + chills 1 22053 22063  
#> + headache 1 22053 22063  
#> + muscle\_ache 1 22053 22063  
#> + nausea\_vomiting 1 22054 22064  
#> + loss\_smell\_taste 1 22054 22064  
#> + nasal\_congestion 1 22054 22064  
#> + diarrhoea 1 22054 22064  
#>   
#> Step: AIC=21887.67  
#> asthma ~ shortness\_breath + Gender + age\_band  
#>   
#> Df Deviance AIC  
#> + sputum 1 21836 21860  
#> + sore\_throat 1 21844 21868  
#> + temperature 3 21858 21886  
#> + cough 1 21864 21888  
#> <none> 21866 21888  
#> + muscle\_ache 1 21865 21889  
#> + headache 1 21865 21889  
#> + loss\_smell\_taste 1 21865 21889  
#> + nausea\_vomiting 1 21865 21889  
#> + diarrhoea 1 21866 21890  
#> + nasal\_congestion 1 21866 21890  
#> + chills 1 21866 21890  
#>   
#> Step: AIC=21859.66  
#> asthma ~ shortness\_breath + Gender + age\_band + sputum  
#>   
#> Df Deviance AIC  
#> + sore\_throat 1 21806 21832  
#> + temperature 3 21826 21856  
#> + muscle\_ache 1 21833 21859  
#> <none> 21836 21860  
#> + headache 1 21834 21860  
#> + loss\_smell\_taste 1 21834 21860  
#> + nasal\_congestion 1 21835 21861  
#> + cough 1 21835 21861  
#> + diarrhoea 1 21835 21861  
#> + chills 1 21836 21862  
#> + nausea\_vomiting 1 21836 21862  
#>   
#> Step: AIC=21832.37  
#> asthma ~ shortness\_breath + Gender + age\_band + sputum + sore\_throat  
#>   
#> Df Deviance AIC  
#> + temperature 3 21799 21831  
#> <none> 21806 21832  
#> + muscle\_ache 1 21806 21834  
#> + nausea\_vomiting 1 21806 21834  
#> + loss\_smell\_taste 1 21806 21834  
#> + chills 1 21806 21834  
#> + nasal\_congestion 1 21806 21834  
#> + headache 1 21806 21834  
#> + cough 1 21806 21834  
#> + diarrhoea 1 21806 21834  
#>   
#> Step: AIC=21830.87  
#> asthma ~ shortness\_breath + Gender + age\_band + sputum + sore\_throat +   
#> temperature  
#>   
#> Df Deviance AIC  
#> <none> 21799 21831  
#> + chills 1 21798 21832  
#> + nausea\_vomiting 1 21798 21832  
#> + muscle\_ache 1 21799 21833  
#> + loss\_smell\_taste 1 21799 21833  
#> + nasal\_congestion 1 21799 21833  
#> + headache 1 21799 21833  
#> + diarrhoea 1 21799 21833  
#> + cough 1 21799 21833

Diabetes type I

#> Start: AIC=5507.41  
#> diabetes\_type\_one ~ 1  
#>   
#> Df Deviance AIC  
#> + age\_band 7 5314.6 5330.6  
#> + temperature 3 5483.4 5491.4  
#> + Gender 2 5485.4 5491.4  
#> + sore\_throat 1 5488.3 5492.3  
#> + headache 1 5498.3 5502.3  
#> + muscle\_ache 1 5498.5 5502.5  
#> + nasal\_congestion 1 5501.6 5505.6  
#> + fatigue 1 5501.6 5505.6  
#> + shortness\_breath 1 5501.7 5505.7  
#> + cough 1 5502.4 5506.4  
#> <none> 5505.4 5507.4  
#> + sputum 1 5504.3 5508.3  
#> + nausea\_vomiting 1 5504.3 5508.3  
#> + diarrhoea 1 5505.3 5509.3  
#> + chills 1 5505.4 5509.4  
#> + loss\_smell\_taste 1 5505.4 5509.4  
#>   
#> Step: AIC=5330.59  
#> diabetes\_type\_one ~ age\_band  
#>   
#> Df Deviance AIC  
#> + Gender 2 5285.9 5305.9  
#> + temperature 3 5290.9 5312.9  
#> + sore\_throat 1 5304.8 5322.8  
#> + cough 1 5307.7 5325.7  
#> + muscle\_ache 1 5308.5 5326.5  
#> + headache 1 5310.5 5328.5  
#> + nausea\_vomiting 1 5312.3 5330.3  
#> <none> 5314.6 5330.6  
#> + fatigue 1 5312.6 5330.6  
#> + shortness\_breath 1 5313.1 5331.1  
#> + nasal\_congestion 1 5313.1 5331.1  
#> + sputum 1 5313.2 5331.2  
#> + diarrhoea 1 5314.5 5332.5  
#> + loss\_smell\_taste 1 5314.5 5332.5  
#> + chills 1 5314.5 5332.5  
#>   
#> Step: AIC=5305.92  
#> diabetes\_type\_one ~ age\_band + Gender  
#>   
#> Df Deviance AIC  
#> + temperature 3 5262.1 5288.1  
#> + sore\_throat 1 5276.5 5298.5  
#> + cough 1 5277.3 5299.3  
#> + muscle\_ache 1 5281.8 5303.8  
#> + nausea\_vomiting 1 5282.8 5304.8  
#> <none> 5285.9 5305.9  
#> + headache 1 5284.0 5306.0  
#> + sputum 1 5284.2 5306.2  
#> + nasal\_congestion 1 5284.3 5306.3  
#> + fatigue 1 5285.0 5307.0  
#> + shortness\_breath 1 5285.1 5307.1  
#> + diarrhoea 1 5285.6 5307.6  
#> + chills 1 5285.9 5307.9  
#> + loss\_smell\_taste 1 5285.9 5307.9  
#>   
#> Step: AIC=5288.15  
#> diabetes\_type\_one ~ age\_band + Gender + temperature  
#>   
#> Df Deviance AIC  
#> + sore\_throat 1 5250.6 5278.6  
#> + muscle\_ache 1 5254.7 5282.7  
#> + cough 1 5255.9 5283.9  
#> + headache 1 5257.3 5285.3  
#> + fatigue 1 5258.4 5286.4  
#> + nasal\_congestion 1 5260.0 5288.0  
#> <none> 5262.1 5288.1  
#> + shortness\_breath 1 5260.4 5288.4  
#> + nausea\_vomiting 1 5261.0 5289.0  
#> + sputum 1 5261.1 5289.1  
#> + chills 1 5261.1 5289.1  
#> + loss\_smell\_taste 1 5261.7 5289.7  
#> + diarrhoea 1 5262.1 5290.1  
#>   
#> Step: AIC=5278.56  
#> diabetes\_type\_one ~ age\_band + Gender + temperature + sore\_throat  
#>   
#> Df Deviance AIC  
#> + cough 1 5240.1 5270.1  
#> + muscle\_ache 1 5246.1 5276.1  
#> + sputum 1 5247.9 5277.9  
#> + headache 1 5248.0 5278.0  
#> <none> 5250.6 5278.6  
#> + nausea\_vomiting 1 5248.8 5278.8  
#> + fatigue 1 5248.9 5278.9  
#> + nasal\_congestion 1 5249.8 5279.8  
#> + shortness\_breath 1 5249.9 5279.9  
#> + chills 1 5250.3 5280.3  
#> + diarrhoea 1 5250.4 5280.4  
#> + loss\_smell\_taste 1 5250.5 5280.5  
#>   
#> Step: AIC=5270.1  
#> diabetes\_type\_one ~ age\_band + Gender + temperature + sore\_throat +   
#> cough  
#>   
#> Df Deviance AIC  
#> + muscle\_ache 1 5234.0 5266.0  
#> + headache 1 5236.3 5268.3  
#> + fatigue 1 5236.5 5268.5  
#> + shortness\_breath 1 5237.9 5269.9  
#> <none> 5240.1 5270.1  
#> + nasal\_congestion 1 5238.3 5270.3  
#> + nausea\_vomiting 1 5238.8 5270.8  
#> + chills 1 5239.4 5271.4  
#> + loss\_smell\_taste 1 5239.7 5271.7  
#> + sputum 1 5240.0 5272.0  
#> + diarrhoea 1 5240.1 5272.1  
#>   
#> Step: AIC=5266.04  
#> diabetes\_type\_one ~ age\_band + Gender + temperature + sore\_throat +   
#> cough + muscle\_ache  
#>   
#> Df Deviance AIC  
#> <none> 5234.0 5266.0  
#> + nausea\_vomiting 1 5232.1 5266.1  
#> + headache 1 5232.4 5266.4  
#> + nasal\_congestion 1 5233.0 5267.0  
#> + shortness\_breath 1 5233.1 5267.1  
#> + fatigue 1 5233.2 5267.2  
#> + sputum 1 5233.7 5267.7  
#> + diarrhoea 1 5233.7 5267.7  
#> + loss\_smell\_taste 1 5234.0 5268.0  
#> + chills 1 5234.0 5268.0

Diabetes type II

#> Start: AIC=21791.84  
#> diabetes\_type\_two ~ 1  
#>   
#> Df Deviance AIC  
#> + age\_band 7 19406 19422  
#> + Gender 2 21674 21680  
#> + sore\_throat 1 21708 21712  
#> + cough 1 21717 21721  
#> + headache 1 21721 21725  
#> + nasal\_congestion 1 21753 21757  
#> + shortness\_breath 1 21762 21766  
#> + sputum 1 21781 21785  
#> + muscle\_ache 1 21781 21785  
#> + chills 1 21784 21788  
#> + loss\_smell\_taste 1 21784 21788  
#> + temperature 3 21784 21792  
#> + nausea\_vomiting 1 21788 21792  
#> <none> 21790 21792  
#> + diarrhoea 1 21788 21792  
#>   
#> Step: AIC=19422.07  
#> diabetes\_type\_two ~ age\_band  
#>   
#> Df Deviance AIC  
#> + Gender 2 19197 19217  
#> + headache 1 19374 19392  
#> + cough 1 19376 19394  
#> + sore\_throat 1 19382 19400  
#> + chills 1 19394 19412  
#> + loss\_smell\_taste 1 19394 19412  
#> + nasal\_congestion 1 19395 19413  
#> + shortness\_breath 1 19398 19416  
#> + temperature 3 19394 19416  
#> + sputum 1 19399 19417  
#> + muscle\_ache 1 19401 19419  
#> <none> 19406 19422  
#> + diarrhoea 1 19405 19423  
#> + nausea\_vomiting 1 19406 19424  
#>   
#> Step: AIC=19216.7  
#> diabetes\_type\_two ~ age\_band + Gender  
#>   
#> Df Deviance AIC  
#> + sore\_throat 1 19176 19198  
#> + cough 1 19176 19198  
#> + headache 1 19182 19204  
#> + nasal\_congestion 1 19187 19209  
#> + temperature 3 19184 19210  
#> + loss\_smell\_taste 1 19191 19213  
#> + chills 1 19191 19213  
#> + sputum 1 19192 19214  
#> + shortness\_breath 1 19193 19215  
#> <none> 19197 19217  
#> + muscle\_ache 1 19196 19218  
#> + nausea\_vomiting 1 19196 19218  
#> + diarrhoea 1 19197 19219  
#>   
#> Step: AIC=19197.53  
#> diabetes\_type\_two ~ age\_band + Gender + sore\_throat  
#>   
#> Df Deviance AIC  
#> + cough 1 19162 19186  
#> + temperature 3 19159 19187  
#> + headache 1 19167 19191  
#> + nasal\_congestion 1 19170 19194  
#> + loss\_smell\_taste 1 19172 19196  
#> + chills 1 19173 19197  
#> <none> 19176 19198  
#> + sputum 1 19174 19198  
#> + nausea\_vomiting 1 19174 19198  
#> + shortness\_breath 1 19174 19198  
#> + diarrhoea 1 19175 19199  
#> + muscle\_ache 1 19176 19200  
#>   
#> Step: AIC=19186.34  
#> diabetes\_type\_two ~ age\_band + Gender + sore\_throat + cough  
#>   
#> Df Deviance AIC  
#> + temperature 3 19141 19171  
#> + headache 1 19156 19182  
#> + nasal\_congestion 1 19159 19185  
#> + nausea\_vomiting 1 19160 19186  
#> + loss\_smell\_taste 1 19160 19186  
#> <none> 19162 19186  
#> + chills 1 19161 19187  
#> + diarrhoea 1 19162 19188  
#> + muscle\_ache 1 19162 19188  
#> + shortness\_breath 1 19162 19188  
#> + sputum 1 19162 19188  
#>   
#> Step: AIC=19171.23  
#> diabetes\_type\_two ~ age\_band + Gender + sore\_throat + cough +   
#> temperature  
#>   
#> Df Deviance AIC  
#> + headache 1 19130 19162  
#> + chills 1 19135 19167  
#> + loss\_smell\_taste 1 19136 19168  
#> + nasal\_congestion 1 19137 19169  
#> <none> 19141 19171  
#> + nausea\_vomiting 1 19141 19173  
#> + shortness\_breath 1 19141 19173  
#> + diarrhoea 1 19141 19173  
#> + muscle\_ache 1 19141 19173  
#> + sputum 1 19141 19173  
#>   
#> Step: AIC=19161.74  
#> diabetes\_type\_two ~ age\_band + Gender + sore\_throat + cough +   
#> temperature + headache  
#>   
#> Df Deviance AIC  
#> + chills 1 19127 19161  
#> + loss\_smell\_taste 1 19127 19161  
#> + nasal\_congestion 1 19128 19162  
#> <none> 19130 19162  
#> + nausea\_vomiting 1 19128 19162  
#> + muscle\_ache 1 19129 19163  
#> + diarrhoea 1 19129 19163  
#> + sputum 1 19130 19164  
#> + shortness\_breath 1 19130 19164  
#>   
#> Step: AIC=19160.83  
#> diabetes\_type\_two ~ age\_band + Gender + sore\_throat + cough +   
#> temperature + headache + chills  
#>   
#> Df Deviance AIC  
#> + loss\_smell\_taste 1 19125 19161  
#> <none> 19127 19161  
#> + nausea\_vomiting 1 19125 19161  
#> + muscle\_ache 1 19125 19161  
#> + nasal\_congestion 1 19125 19161  
#> + diarrhoea 1 19126 19162  
#> + sputum 1 19127 19163  
#> + shortness\_breath 1 19127 19163  
#>   
#> Step: AIC=19160.82  
#> diabetes\_type\_two ~ age\_band + Gender + sore\_throat + cough +   
#> temperature + headache + chills + loss\_smell\_taste  
#>   
#> Df Deviance AIC  
#> + nausea\_vomiting 1 19123 19161  
#> + muscle\_ache 1 19123 19161  
#> <none> 19125 19161  
#> + diarrhoea 1 19123 19161  
#> + nasal\_congestion 1 19124 19162  
#> + sputum 1 19125 19163  
#> + shortness\_breath 1 19125 19163  
#>   
#> Step: AIC=19160.55  
#> diabetes\_type\_two ~ age\_band + Gender + sore\_throat + cough +   
#> temperature + headache + chills + loss\_smell\_taste + nausea\_vomiting  
#>   
#> Df Deviance AIC  
#> <none> 19123 19161  
#> + muscle\_ache 1 19121 19161  
#> + nasal\_congestion 1 19121 19161  
#> + diarrhoea 1 19122 19162  
#> + sputum 1 19122 19162  
#> + shortness\_breath 1 19122 19162

Hypertension

#> Start: AIC=43459.42  
#> hypertension ~ 1  
#>   
#> Df Deviance AIC  
#> + age\_band 7 39691 39707  
#> + Gender 2 43384 43390  
#> + sputum 1 43438 43442  
#> + temperature 3 43437 43445  
#> + muscle\_ache 1 43445 43449  
#> + headache 1 43446 43450  
#> + sore\_throat 1 43451 43455  
#> + shortness\_breath 1 43453 43457  
#> + diarrhoea 1 43454 43458  
#> <none> 43457 43459  
#> + nausea\_vomiting 1 43456 43460  
#> + cough 1 43457 43461  
#> + loss\_smell\_taste 1 43457 43461  
#> + nasal\_congestion 1 43457 43461  
#> + chills 1 43457 43461  
#>   
#> Step: AIC=39707.4  
#> hypertension ~ age\_band  
#>   
#> Df Deviance AIC  
#> + Gender 2 39520 39540  
#> + sputum 1 39665 39683  
#> + muscle\_ache 1 39670 39688  
#> + nasal\_congestion 1 39677 39695  
#> + cough 1 39679 39697  
#> + sore\_throat 1 39684 39702  
#> + diarrhoea 1 39685 39703  
#> + temperature 3 39685 39707  
#> <none> 39691 39707  
#> + nausea\_vomiting 1 39690 39708  
#> + chills 1 39690 39708  
#> + shortness\_breath 1 39690 39708  
#> + loss\_smell\_taste 1 39691 39709  
#> + headache 1 39691 39709  
#>   
#> Step: AIC=39540.43  
#> hypertension ~ age\_band + Gender  
#>   
#> Df Deviance AIC  
#> + muscle\_ache 1 39487 39509  
#> + sputum 1 39491 39513  
#> + cough 1 39503 39525  
#> + nasal\_congestion 1 39507 39529  
#> + diarrhoea 1 39512 39534  
#> + sore\_throat 1 39512 39534  
#> + temperature 3 39513 39539  
#> + shortness\_breath 1 39517 39539  
#> + nausea\_vomiting 1 39517 39539  
#> + headache 1 39518 39540  
#> <none> 39520 39540  
#> + chills 1 39520 39542  
#> + loss\_smell\_taste 1 39520 39542  
#>   
#> Step: AIC=39508.87  
#> hypertension ~ age\_band + Gender + muscle\_ache  
#>   
#> Df Deviance AIC  
#> + sputum 1 39467 39491  
#> + cough 1 39476 39500  
#> + nasal\_congestion 1 39480 39504  
#> + chills 1 39482 39506  
#> + diarrhoea 1 39483 39507  
#> + sore\_throat 1 39484 39508  
#> + temperature 3 39480 39508  
#> <none> 39487 39509  
#> + loss\_smell\_taste 1 39486 39510  
#> + nausea\_vomiting 1 39486 39510  
#> + headache 1 39487 39511  
#> + shortness\_breath 1 39487 39511  
#>   
#> Step: AIC=39490.67  
#> hypertension ~ age\_band + Gender + muscle\_ache + sputum  
#>   
#> Df Deviance AIC  
#> + chills 1 39460 39486  
#> + nasal\_congestion 1 39464 39490  
#> + temperature 3 39460 39490  
#> + cough 1 39464 39490  
#> + diarrhoea 1 39464 39490  
#> + loss\_smell\_taste 1 39464 39490  
#> <none> 39467 39491  
#> + sore\_throat 1 39465 39491  
#> + headache 1 39466 39492  
#> + nausea\_vomiting 1 39466 39492  
#> + shortness\_breath 1 39466 39492  
#>   
#> Step: AIC=39486.08  
#> hypertension ~ age\_band + Gender + muscle\_ache + sputum + chills  
#>   
#> Df Deviance AIC  
#> + nasal\_congestion 1 39456 39484  
#> + diarrhoea 1 39456 39484  
#> + temperature 3 39453 39485  
#> + cough 1 39457 39485  
#> <none> 39460 39486  
#> + sore\_throat 1 39458 39486  
#> + nausea\_vomiting 1 39459 39487  
#> + loss\_smell\_taste 1 39459 39487  
#> + headache 1 39460 39488  
#> + shortness\_breath 1 39460 39488  
#>   
#> Step: AIC=39483.84  
#> hypertension ~ age\_band + Gender + muscle\_ache + sputum + chills +   
#> nasal\_congestion  
#>   
#> Df Deviance AIC  
#> + temperature 3 39448 39482  
#> + diarrhoea 1 39452 39482  
#> + cough 1 39453 39483  
#> <none> 39456 39484  
#> + loss\_smell\_taste 1 39454 39484  
#> + sore\_throat 1 39455 39485  
#> + nausea\_vomiting 1 39455 39485  
#> + headache 1 39455 39485  
#> + shortness\_breath 1 39456 39486  
#>   
#> Step: AIC=39482.28  
#> hypertension ~ age\_band + Gender + muscle\_ache + sputum + chills +   
#> nasal\_congestion + temperature  
#>   
#> Df Deviance AIC  
#> + diarrhoea 1 39445 39481  
#> + cough 1 39445 39481  
#> + loss\_smell\_taste 1 39446 39482  
#> <none> 39448 39482  
#> + sore\_throat 1 39447 39483  
#> + nausea\_vomiting 1 39447 39483  
#> + headache 1 39448 39484  
#> + shortness\_breath 1 39448 39484  
#>   
#> Step: AIC=39481.09  
#> hypertension ~ age\_band + Gender + muscle\_ache + sputum + chills +   
#> nasal\_congestion + temperature + diarrhoea  
#>   
#> Df Deviance AIC  
#> + loss\_smell\_taste 1 39442 39480  
#> + cough 1 39442 39480  
#> <none> 39445 39481  
#> + sore\_throat 1 39444 39482  
#> + headache 1 39444 39482  
#> + shortness\_breath 1 39445 39483  
#> + nausea\_vomiting 1 39445 39483  
#>   
#> Step: AIC=39480.2  
#> hypertension ~ age\_band + Gender + muscle\_ache + sputum + chills +   
#> nasal\_congestion + temperature + diarrhoea + loss\_smell\_taste  
#>   
#> Df Deviance AIC  
#> + cough 1 39439 39479  
#> <none> 39442 39480  
#> + sore\_throat 1 39441 39481  
#> + nausea\_vomiting 1 39442 39482  
#> + headache 1 39442 39482  
#> + shortness\_breath 1 39442 39482  
#>   
#> Step: AIC=39479.26  
#> hypertension ~ age\_band + Gender + muscle\_ache + sputum + chills +   
#> nasal\_congestion + temperature + diarrhoea + loss\_smell\_taste +   
#> cough  
#>   
#> Df Deviance AIC  
#> <none> 39439 39479  
#> + sore\_throat 1 39438 39480  
#> + shortness\_breath 1 39439 39481  
#> + headache 1 39439 39481  
#> + nausea\_vomiting 1 39439 39481

Heart disease

#> Start: AIC=7435.68  
#> heart\_disease ~ 1  
#>   
#> Df Deviance AIC  
#> + age\_band 7 6809.4 6825.4  
#> + Gender 2 7398.8 7404.8  
#> + chills 1 7410.5 7414.5  
#> + shortness\_breath 1 7414.5 7418.5  
#> + temperature 3 7420.9 7428.9  
#> + nausea\_vomiting 1 7425.8 7429.8  
#> + muscle\_ache 1 7427.6 7431.6  
#> + sputum 1 7428.5 7432.5  
#> + headache 1 7430.1 7434.1  
#> + sore\_throat 1 7430.1 7434.1  
#> + diarrhoea 1 7431.3 7435.3  
#> <none> 7433.7 7435.7  
#> + loss\_smell\_taste 1 7432.4 7436.4  
#> + cough 1 7433.3 7437.3  
#> + nasal\_congestion 1 7433.6 7437.6  
#>   
#> Step: AIC=6825.39  
#> heart\_disease ~ age\_band  
#>   
#> Df Deviance AIC  
#> + Gender 2 6750.4 6770.4  
#> + shortness\_breath 1 6778.4 6796.4  
#> + chills 1 6790.2 6808.2  
#> + nausea\_vomiting 1 6796.8 6814.8  
#> + muscle\_ache 1 6798.9 6816.9  
#> + temperature 3 6795.5 6817.5  
#> + sputum 1 6803.1 6821.1  
#> + diarrhoea 1 6805.7 6823.7  
#> <none> 6809.4 6825.4  
#> + nasal\_congestion 1 6807.8 6825.8  
#> + cough 1 6808.3 6826.3  
#> + loss\_smell\_taste 1 6808.7 6826.7  
#> + sore\_throat 1 6808.7 6826.7  
#> + headache 1 6809.4 6827.4  
#>   
#> Step: AIC=6770.41  
#> heart\_disease ~ age\_band + Gender  
#>   
#> Df Deviance AIC  
#> + shortness\_breath 1 6713.4 6735.4  
#> + chills 1 6724.9 6746.9  
#> + muscle\_ache 1 6734.1 6756.1  
#> + nausea\_vomiting 1 6734.8 6756.8  
#> + temperature 3 6735.9 6761.9  
#> + sputum 1 6742.7 6764.7  
#> + diarrhoea 1 6745.0 6767.0  
#> + cough 1 6747.8 6769.8  
#> <none> 6750.4 6770.4  
#> + nasal\_congestion 1 6748.6 6770.6  
#> + loss\_smell\_taste 1 6748.6 6770.6  
#> + sore\_throat 1 6749.3 6771.3  
#> + headache 1 6749.6 6771.6  
#>   
#> Step: AIC=6735.41  
#> heart\_disease ~ age\_band + Gender + shortness\_breath  
#>   
#> Df Deviance AIC  
#> + chills 1 6699.7 6723.7  
#> + nausea\_vomiting 1 6703.5 6727.5  
#> + temperature 3 6702.5 6730.5  
#> + muscle\_ache 1 6708.2 6732.2  
#> <none> 6713.4 6735.4  
#> + diarrhoea 1 6711.9 6735.9  
#> + sputum 1 6712.0 6736.0  
#> + headache 1 6713.1 6737.1  
#> + nasal\_congestion 1 6713.4 6737.4  
#> + loss\_smell\_taste 1 6713.4 6737.4  
#> + sore\_throat 1 6713.4 6737.4  
#> + cough 1 6713.4 6737.4  
#>   
#> Step: AIC=6723.74  
#> heart\_disease ~ age\_band + Gender + shortness\_breath + chills  
#>   
#> Df Deviance AIC  
#> + nausea\_vomiting 1 6693.8 6719.8  
#> + temperature 3 6692.4 6722.4  
#> + headache 1 6696.7 6722.7  
#> <none> 6699.7 6723.7  
#> + muscle\_ache 1 6698.0 6724.0  
#> + sputum 1 6699.1 6725.1  
#> + nasal\_congestion 1 6699.1 6725.1  
#> + loss\_smell\_taste 1 6699.2 6725.2  
#> + sore\_throat 1 6699.3 6725.3  
#> + diarrhoea 1 6699.5 6725.5  
#> + cough 1 6699.5 6725.5  
#>   
#> Step: AIC=6719.76  
#> heart\_disease ~ age\_band + Gender + shortness\_breath + chills +   
#> nausea\_vomiting  
#>   
#> Df Deviance AIC  
#> + headache 1 6689.9 6717.9  
#> + temperature 3 6687.4 6719.4  
#> <none> 6693.8 6719.8  
#> + muscle\_ache 1 6692.4 6720.4  
#> + loss\_smell\_taste 1 6692.6 6720.6  
#> + nasal\_congestion 1 6693.0 6721.0  
#> + sore\_throat 1 6693.2 6721.2  
#> + sputum 1 6693.3 6721.3  
#> + cough 1 6693.4 6721.4  
#> + diarrhoea 1 6693.8 6721.8  
#>   
#> Step: AIC=6717.94  
#> heart\_disease ~ age\_band + Gender + shortness\_breath + chills +   
#> nausea\_vomiting + headache  
#>   
#> Df Deviance AIC  
#> + muscle\_ache 1 6686.9 6716.9  
#> + temperature 3 6683.3 6717.3  
#> <none> 6689.9 6717.9  
#> + loss\_smell\_taste 1 6689.2 6719.2  
#> + sputum 1 6689.2 6719.2  
#> + nasal\_congestion 1 6689.6 6719.6  
#> + sore\_throat 1 6689.7 6719.7  
#> + cough 1 6689.8 6719.8  
#> + diarrhoea 1 6689.9 6719.9  
#>   
#> Step: AIC=6716.88  
#> heart\_disease ~ age\_band + Gender + shortness\_breath + chills +   
#> nausea\_vomiting + headache + muscle\_ache  
#>   
#> Df Deviance AIC  
#> + temperature 3 6680.3 6716.3  
#> <none> 6686.9 6716.9  
#> + loss\_smell\_taste 1 6685.9 6717.9  
#> + nasal\_congestion 1 6686.3 6718.3  
#> + sputum 1 6686.4 6718.4  
#> + sore\_throat 1 6686.4 6718.4  
#> + cough 1 6686.6 6718.6  
#> + diarrhoea 1 6686.9 6718.9  
#>   
#> Step: AIC=6716.3  
#> heart\_disease ~ age\_band + Gender + shortness\_breath + chills +   
#> nausea\_vomiting + headache + muscle\_ache + temperature  
#>   
#> Df Deviance AIC  
#> <none> 6680.3 6716.3  
#> + loss\_smell\_taste 1 6679.2 6717.2  
#> + nasal\_congestion 1 6679.8 6717.8  
#> + sputum 1 6679.8 6717.8  
#> + sore\_throat 1 6679.9 6717.9  
#> + cough 1 6680.0 6718.0  
#> + diarrhoea 1 6680.3 6718.3

Lung Disease

#> Start: AIC=10302.93  
#> lung\_condition ~ 1  
#>   
#> Df Deviance AIC  
#> + age\_band 7 10044 10060  
#> + shortness\_breath 1 10061 10065  
#> + sputum 1 10130 10134  
#> + cough 1 10218 10222  
#> + muscle\_ache 1 10242 10246  
#> + chills 1 10273 10277  
#> + nasal\_congestion 1 10275 10279  
#> + nausea\_vomiting 1 10280 10284  
#> + loss\_smell\_taste 1 10288 10292  
#> + temperature 3 10289 10297  
#> + diarrhoea 1 10295 10299  
#> + headache 1 10296 10300  
#> <none> 10301 10303  
#> + Gender 2 10298 10304  
#> + sore\_throat 1 10300 10304  
#>   
#> Step: AIC=10059.77  
#> lung\_condition ~ age\_band  
#>   
#> Df Deviance AIC  
#> + shortness\_breath 1 9784.6 9802.6  
#> + sputum 1 9870.2 9888.2  
#> + cough 1 9945.0 9963.0  
#> + muscle\_ache 1 9976.0 9994.0  
#> + nasal\_congestion 1 10009.5 10027.5  
#> + chills 1 10017.4 10035.4  
#> + nausea\_vomiting 1 10020.2 10038.2  
#> + loss\_smell\_taste 1 10030.5 10048.5  
#> + temperature 3 10028.2 10050.2  
#> + headache 1 10032.8 10050.8  
#> + diarrhoea 1 10036.3 10054.3  
#> + sore\_throat 1 10038.9 10056.9  
#> + Gender 2 10037.1 10057.1  
#> <none> 10043.8 10059.8  
#>   
#> Step: AIC=9802.56  
#> lung\_condition ~ age\_band + shortness\_breath  
#>   
#> Df Deviance AIC  
#> + sputum 1 9694.6 9714.6  
#> + cough 1 9746.5 9766.5  
#> + muscle\_ache 1 9770.7 9790.7  
#> + Gender 2 9774.5 9796.5  
#> + nausea\_vomiting 1 9776.6 9796.6  
#> + temperature 3 9775.8 9799.8  
#> + nasal\_congestion 1 9780.3 9800.3  
#> + chills 1 9781.7 9801.7  
#> <none> 9784.6 9802.6  
#> + loss\_smell\_taste 1 9783.9 9803.9  
#> + sore\_throat 1 9784.4 9804.4  
#> + headache 1 9784.5 9804.5  
#> + diarrhoea 1 9784.6 9804.6  
#>   
#> Step: AIC=9714.6  
#> lung\_condition ~ age\_band + shortness\_breath + sputum  
#>   
#> Df Deviance AIC  
#> + Gender 2 9684.2 9708.2  
#> + cough 1 9687.3 9709.3  
#> + muscle\_ache 1 9687.8 9709.8  
#> + nausea\_vomiting 1 9690.1 9712.1  
#> + temperature 3 9686.8 9712.8  
#> + sore\_throat 1 9691.6 9713.6  
#> <none> 9694.6 9714.6  
#> + headache 1 9693.6 9715.6  
#> + chills 1 9694.0 9716.0  
#> + diarrhoea 1 9694.2 9716.2  
#> + nasal\_congestion 1 9694.4 9716.4  
#> + loss\_smell\_taste 1 9694.6 9716.6  
#>   
#> Step: AIC=9708.15  
#> lung\_condition ~ age\_band + shortness\_breath + sputum + Gender  
#>   
#> Df Deviance AIC  
#> + muscle\_ache 1 9675.9 9701.9  
#> + cough 1 9676.0 9702.0  
#> + nausea\_vomiting 1 9679.2 9705.2  
#> + temperature 3 9676.8 9706.8  
#> + sore\_throat 1 9681.2 9707.2  
#> <none> 9684.2 9708.2  
#> + chills 1 9683.3 9709.3  
#> + headache 1 9683.7 9709.7  
#> + diarrhoea 1 9683.9 9709.9  
#> + nasal\_congestion 1 9684.0 9710.0  
#> + loss\_smell\_taste 1 9684.1 9710.1  
#>   
#> Step: AIC=9701.9  
#> lung\_condition ~ age\_band + shortness\_breath + sputum + Gender +   
#> muscle\_ache  
#>   
#> Df Deviance AIC  
#> + cough 1 9668.8 9696.8  
#> + sore\_throat 1 9670.8 9698.8  
#> + nausea\_vomiting 1 9672.2 9700.2  
#> + temperature 3 9668.7 9700.7  
#> + headache 1 9673.0 9701.0  
#> <none> 9675.9 9701.9  
#> + diarrhoea 1 9674.9 9702.9  
#> + loss\_smell\_taste 1 9675.9 9703.9  
#> + chills 1 9675.9 9703.9  
#> + nasal\_congestion 1 9675.9 9703.9  
#>   
#> Step: AIC=9696.77  
#> lung\_condition ~ age\_band + shortness\_breath + sputum + Gender +   
#> muscle\_ache + cough  
#>   
#> Df Deviance AIC  
#> + sore\_throat 1 9662.0 9692.0  
#> + headache 1 9665.2 9695.2  
#> + nausea\_vomiting 1 9665.5 9695.5  
#> + temperature 3 9661.6 9695.6  
#> <none> 9668.8 9696.8  
#> + diarrhoea 1 9667.6 9697.6  
#> + loss\_smell\_taste 1 9668.6 9698.6  
#> + nasal\_congestion 1 9668.7 9698.7  
#> + chills 1 9668.8 9698.8  
#>   
#> Step: AIC=9692.04  
#> lung\_condition ~ age\_band + shortness\_breath + sputum + Gender +   
#> muscle\_ache + cough + sore\_throat  
#>   
#> Df Deviance AIC  
#> + nausea\_vomiting 1 9658.3 9690.3  
#> + temperature 3 9655.0 9691.0  
#> + headache 1 9659.5 9691.5  
#> <none> 9662.0 9692.0  
#> + diarrhoea 1 9661.2 9693.2  
#> + chills 1 9662.0 9694.0  
#> + loss\_smell\_taste 1 9662.0 9694.0  
#> + nasal\_congestion 1 9662.0 9694.0  
#>   
#> Step: AIC=9690.27  
#> lung\_condition ~ age\_band + shortness\_breath + sputum + Gender +   
#> muscle\_ache + cough + sore\_throat + nausea\_vomiting  
#>   
#> Df Deviance AIC  
#> + temperature 3 9651.1 9689.1  
#> + headache 1 9655.1 9689.1  
#> <none> 9658.3 9690.3  
#> + diarrhoea 1 9656.4 9690.4  
#> + loss\_smell\_taste 1 9658.0 9692.0  
#> + chills 1 9658.3 9692.3  
#> + nasal\_congestion 1 9658.3 9692.3  
#>   
#> Step: AIC=9689.11  
#> lung\_condition ~ age\_band + shortness\_breath + sputum + Gender +   
#> muscle\_ache + cough + sore\_throat + nausea\_vomiting + temperature  
#>   
#> Df Deviance AIC  
#> + headache 1 9648.1 9688.1  
#> <none> 9651.1 9689.1  
#> + diarrhoea 1 9649.3 9689.3  
#> + loss\_smell\_taste 1 9650.9 9690.9  
#> + chills 1 9651.1 9691.1  
#> + nasal\_congestion 1 9651.1 9691.1  
#>   
#> Step: AIC=9688.07  
#> lung\_condition ~ age\_band + shortness\_breath + sputum + Gender +   
#> muscle\_ache + cough + sore\_throat + nausea\_vomiting + temperature +   
#> headache  
#>   
#> Df Deviance AIC  
#> <none> 9648.1 9688.1  
#> + diarrhoea 1 9646.7 9688.7  
#> + chills 1 9647.9 9689.9  
#> + loss\_smell\_taste 1 9648.0 9690.0  
#> + nasal\_congestion 1 9648.0 9690.0

Liver disease

#> Start: AIC=4267.59  
#> liver\_disease ~ 1  
#>   
#> Df Deviance AIC  
#> + muscle\_ache 1 4214.4 4218.4  
#> + nausea\_vomiting 1 4217.9 4221.9  
#> + chills 1 4226.8 4230.8  
#> + temperature 3 4232.5 4240.5  
#> + Gender 2 4244.0 4250.0  
#> + shortness\_breath 1 4247.0 4251.0  
#> + sputum 1 4247.3 4251.3  
#> + headache 1 4248.1 4252.1  
#> + age\_band 7 4236.8 4252.8  
#> + diarrhoea 1 4250.7 4254.7  
#> + loss\_smell\_taste 1 4253.7 4257.7  
#> + sore\_throat 1 4255.5 4259.5  
#> + nasal\_congestion 1 4255.9 4259.9  
#> + cough 1 4257.4 4261.4  
#> <none> 4265.6 4267.6  
#>   
#> Step: AIC=4218.4  
#> liver\_disease ~ muscle\_ache  
#>   
#> Df Deviance AIC  
#> + nausea\_vomiting 1 4179.2 4185.2  
#> + Gender 2 4188.1 4196.1  
#> + chills 1 4196.5 4202.5  
#> + age\_band 7 4184.8 4202.8  
#> + temperature 3 4193.3 4203.3  
#> + sputum 1 4204.3 4210.3  
#> + shortness\_breath 1 4207.9 4213.9  
#> + diarrhoea 1 4208.2 4214.2  
#> + loss\_smell\_taste 1 4209.9 4215.9  
#> + nasal\_congestion 1 4211.0 4217.0  
#> + cough 1 4211.2 4217.2  
#> + sore\_throat 1 4211.2 4217.2  
#> + headache 1 4211.6 4217.6  
#> <none> 4214.4 4218.4  
#>   
#> Step: AIC=4185.21  
#> liver\_disease ~ muscle\_ache + nausea\_vomiting  
#>   
#> Df Deviance AIC  
#> + Gender 2 4151.1 4161.1  
#> + age\_band 7 4147.2 4167.2  
#> + chills 1 4169.0 4177.0  
#> + temperature 3 4165.4 4177.4  
#> + sputum 1 4172.2 4180.2  
#> + shortness\_breath 1 4175.7 4183.7  
#> <none> 4179.2 4185.2  
#> + nasal\_congestion 1 4177.4 4185.4  
#> + sore\_throat 1 4177.4 4185.4  
#> + cough 1 4177.6 4185.6  
#> + loss\_smell\_taste 1 4177.8 4185.8  
#> + diarrhoea 1 4178.0 4186.0  
#> + headache 1 4178.3 4186.3  
#>   
#> Step: AIC=4161.15  
#> liver\_disease ~ muscle\_ache + nausea\_vomiting + Gender  
#>   
#> Df Deviance AIC  
#> + age\_band 7 4117.2 4141.2  
#> + chills 1 4139.8 4151.8  
#> + temperature 3 4138.5 4154.5  
#> + sputum 1 4144.5 4156.5  
#> + shortness\_breath 1 4147.5 4159.5  
#> <none> 4151.1 4161.1  
#> + headache 1 4149.3 4161.3  
#> + loss\_smell\_taste 1 4149.4 4161.4  
#> + cough 1 4149.4 4161.4  
#> + sore\_throat 1 4149.7 4161.7  
#> + diarrhoea 1 4149.9 4161.9  
#> + nasal\_congestion 1 4150.1 4162.1  
#>   
#> Step: AIC=4141.15  
#> liver\_disease ~ muscle\_ache + nausea\_vomiting + Gender + age\_band  
#>   
#> Df Deviance AIC  
#> + chills 1 4106.4 4132.4  
#> + temperature 3 4103.4 4133.4  
#> + sputum 1 4110.9 4136.9  
#> + shortness\_breath 1 4112.8 4138.8  
#> + headache 1 4114.5 4140.5  
#> + cough 1 4114.6 4140.6  
#> <none> 4117.2 4141.2  
#> + sore\_throat 1 4115.2 4141.2  
#> + nasal\_congestion 1 4115.3 4141.3  
#> + loss\_smell\_taste 1 4115.8 4141.8  
#> + diarrhoea 1 4115.8 4141.8  
#>   
#> Step: AIC=4132.42  
#> liver\_disease ~ muscle\_ache + nausea\_vomiting + Gender + age\_band +   
#> chills  
#>   
#> Df Deviance AIC  
#> + temperature 3 4097.1 4129.1  
#> + sputum 1 4101.6 4129.6  
#> + shortness\_breath 1 4103.8 4131.8  
#> <none> 4106.4 4132.4  
#> + cough 1 4104.9 4132.9  
#> + sore\_throat 1 4105.4 4133.4  
#> + headache 1 4105.6 4133.6  
#> + nasal\_congestion 1 4105.6 4133.6  
#> + diarrhoea 1 4106.0 4134.0  
#> + loss\_smell\_taste 1 4106.1 4134.1  
#>   
#> Step: AIC=4129.07  
#> liver\_disease ~ muscle\_ache + nausea\_vomiting + Gender + age\_band +   
#> chills + temperature  
#>   
#> Df Deviance AIC  
#> + sputum 1 4092.5 4126.5  
#> + shortness\_breath 1 4094.7 4128.7  
#> <none> 4097.1 4129.1  
#> + cough 1 4095.9 4129.9  
#> + sore\_throat 1 4096.2 4130.2  
#> + nasal\_congestion 1 4096.3 4130.3  
#> + headache 1 4096.6 4130.6  
#> + diarrhoea 1 4096.9 4130.9  
#> + loss\_smell\_taste 1 4097.0 4131.0  
#>   
#> Step: AIC=4126.47  
#> liver\_disease ~ muscle\_ache + nausea\_vomiting + Gender + age\_band +   
#> chills + temperature + sputum  
#>   
#> Df Deviance AIC  
#> <none> 4092.5 4126.5  
#> + shortness\_breath 1 4091.1 4127.1  
#> + sore\_throat 1 4092.0 4128.0  
#> + headache 1 4092.1 4128.1  
#> + nasal\_congestion 1 4092.2 4128.2  
#> + diarrhoea 1 4092.4 4128.4  
#> + cough 1 4092.4 4128.4  
#> + loss\_smell\_taste 1 4092.5 4128.5

Kidney disease

#> Start: AIC=3733.17  
#> kidney\_disease ~ 1  
#>   
#> Df Deviance AIC  
#> + loss\_smell\_taste 1 3699.8 3703.8  
#> + age\_band 7 3696.8 3712.8  
#> + cough 1 3716.3 3720.3  
#> + muscle\_ache 1 3717.6 3721.6  
#> + shortness\_breath 1 3717.9 3721.9  
#> + fatigue 1 3719.1 3723.1  
#> + temperature 3 3717.0 3725.0  
#> + sore\_throat 1 3723.6 3727.6  
#> + diarrhoea 1 3725.4 3729.4  
#> + headache 1 3725.4 3729.4  
#> + nausea\_vomiting 1 3726.8 3730.8  
#> + sputum 1 3727.7 3731.7  
#> + Gender 2 3726.0 3732.0  
#> <none> 3731.2 3733.2  
#> + nasal\_congestion 1 3729.7 3733.7  
#> + chills 1 3729.8 3733.8  
#>   
#> Step: AIC=3703.78  
#> kidney\_disease ~ loss\_smell\_taste  
#>   
#> Df Deviance AIC  
#> + age\_band 7 3665.8 3683.8  
#> + cough 1 3689.8 3695.8  
#> + shortness\_breath 1 3692.5 3698.5  
#> + muscle\_ache 1 3693.0 3699.0  
#> + fatigue 1 3694.9 3700.9  
#> + temperature 3 3691.5 3701.5  
#> + sore\_throat 1 3695.5 3701.5  
#> + Gender 2 3693.6 3701.6  
#> <none> 3699.8 3703.8  
#> + diarrhoea 1 3698.1 3704.1  
#> + sputum 1 3698.3 3704.3  
#> + nausea\_vomiting 1 3698.3 3704.3  
#> + headache 1 3698.3 3704.3  
#> + chills 1 3699.8 3705.8  
#> + nasal\_congestion 1 3699.8 3705.8  
#>   
#> Step: AIC=3683.84  
#> kidney\_disease ~ loss\_smell\_taste + age\_band  
#>   
#> Df Deviance AIC  
#> + cough 1 3654.3 3674.3  
#> + shortness\_breath 1 3658.1 3678.1  
#> + muscle\_ache 1 3658.6 3678.6  
#> + sore\_throat 1 3659.4 3679.4  
#> + Gender 2 3658.1 3680.1  
#> + fatigue 1 3660.4 3680.4  
#> + temperature 3 3657.3 3681.3  
#> + headache 1 3663.5 3683.5  
#> <none> 3665.8 3683.8  
#> + diarrhoea 1 3664.0 3684.0  
#> + nausea\_vomiting 1 3664.2 3684.2  
#> + sputum 1 3664.3 3684.3  
#> + chills 1 3665.8 3685.8  
#> + nasal\_congestion 1 3665.8 3685.8  
#>   
#> Step: AIC=3674.28  
#> kidney\_disease ~ loss\_smell\_taste + age\_band + cough  
#>   
#> Df Deviance AIC  
#> + Gender 2 3645.7 3669.7  
#> + muscle\_ache 1 3649.3 3671.3  
#> + shortness\_breath 1 3649.9 3671.9  
#> + sore\_throat 1 3650.6 3672.6  
#> + temperature 3 3647.0 3673.0  
#> + fatigue 1 3651.4 3673.4  
#> <none> 3654.3 3674.3  
#> + headache 1 3653.1 3675.1  
#> + diarrhoea 1 3653.1 3675.1  
#> + nausea\_vomiting 1 3653.2 3675.2  
#> + chills 1 3653.7 3675.7  
#> + nasal\_congestion 1 3654.2 3676.2  
#> + sputum 1 3654.3 3676.3  
#>   
#> Step: AIC=3669.73  
#> kidney\_disease ~ loss\_smell\_taste + age\_band + cough + Gender  
#>   
#> Df Deviance AIC  
#> + muscle\_ache 1 3639.7 3665.7  
#> + shortness\_breath 1 3641.0 3667.0  
#> + sore\_throat 1 3642.1 3668.1  
#> + fatigue 1 3642.2 3668.2  
#> + temperature 3 3638.5 3668.5  
#> <none> 3645.7 3669.7  
#> + headache 1 3643.8 3669.8  
#> + diarrhoea 1 3644.5 3670.5  
#> + nausea\_vomiting 1 3644.5 3670.5  
#> + chills 1 3645.4 3671.4  
#> + nasal\_congestion 1 3645.6 3671.6  
#> + sputum 1 3645.7 3671.7  
#>   
#> Step: AIC=3665.72  
#> kidney\_disease ~ loss\_smell\_taste + age\_band + cough + Gender +   
#> muscle\_ache  
#>   
#> Df Deviance AIC  
#> + shortness\_breath 1 3637.0 3665.0  
#> + sore\_throat 1 3637.5 3665.5  
#> + temperature 3 3633.6 3665.6  
#> <none> 3639.7 3665.7  
#> + chills 1 3638.1 3666.1  
#> + nausea\_vomiting 1 3639.0 3667.0  
#> + fatigue 1 3639.0 3667.0  
#> + nasal\_congestion 1 3639.2 3667.2  
#> + diarrhoea 1 3639.2 3667.2  
#> + headache 1 3639.4 3667.4  
#> + sputum 1 3639.6 3667.6  
#>   
#> Step: AIC=3664.96  
#> kidney\_disease ~ loss\_smell\_taste + age\_band + cough + Gender +   
#> muscle\_ache + shortness\_breath  
#>   
#> Df Deviance AIC  
#> + chills 1 3634.8 3664.8  
#> <none> 3637.0 3665.0  
#> + sore\_throat 1 3635.0 3665.0  
#> + temperature 3 3631.1 3665.1  
#> + nasal\_congestion 1 3636.0 3666.0  
#> + nausea\_vomiting 1 3636.4 3666.4  
#> + sputum 1 3636.6 3666.6  
#> + diarrhoea 1 3636.6 3666.6  
#> + fatigue 1 3636.7 3666.7  
#> + headache 1 3636.7 3666.7  
#>   
#> Step: AIC=3664.77  
#> kidney\_disease ~ loss\_smell\_taste + age\_band + cough + Gender +   
#> muscle\_ache + shortness\_breath + chills  
#>   
#> Df Deviance AIC  
#> + temperature 3 3627.4 3663.4  
#> + sore\_throat 1 3632.4 3664.4  
#> <none> 3634.8 3664.8  
#> + nausea\_vomiting 1 3633.8 3665.8  
#> + nasal\_congestion 1 3634.0 3666.0  
#> + diarrhoea 1 3634.2 3666.2  
#> + headache 1 3634.2 3666.2  
#> + fatigue 1 3634.3 3666.3  
#> + sputum 1 3634.4 3666.4  
#>   
#> Step: AIC=3663.37  
#> kidney\_disease ~ loss\_smell\_taste + age\_band + cough + Gender +   
#> muscle\_ache + shortness\_breath + chills + temperature  
#>   
#> Df Deviance AIC  
#> + sore\_throat 1 3625.0 3663.0  
#> <none> 3627.4 3663.4  
#> + nasal\_congestion 1 3626.7 3664.7  
#> + nausea\_vomiting 1 3626.9 3664.9  
#> + diarrhoea 1 3626.9 3664.9  
#> + headache 1 3627.0 3665.0  
#> + sputum 1 3627.0 3665.0  
#> + fatigue 1 3627.1 3665.1  
#>   
#> Step: AIC=3663.03  
#> kidney\_disease ~ loss\_smell\_taste + age\_band + cough + Gender +   
#> muscle\_ache + shortness\_breath + chills + temperature + sore\_throat  
#>   
#> Df Deviance AIC  
#> <none> 3625.0 3663.0  
#> + nasal\_congestion 1 3624.2 3664.2  
#> + sputum 1 3624.6 3664.6  
#> + nausea\_vomiting 1 3624.6 3664.6  
#> + diarrhoea 1 3624.7 3664.7  
#> + headache 1 3624.8 3664.8  
#> + fatigue 1 3624.8 3664.8