Week 6 (18 October – 24 October)

* Extract raw datasets and do data cleaning
* Create table with AreaName+IndicatorID+Age+Sex+Value (ds1)
* Create wide column, combine IndicatorID+Age+Sex as column names (analysis)
* Remove variable with >7 NA values
* Define ‘Suicide’ = ‘Suicide: age-standardised rate per 100,000 population (3 year average) 10+ yrs\_Persons’ column only/remove columns containing ‘suicide’.
* Rename columns with shorter name (analysis1)
* Remove area name (analysis\_final)
* Get the dataprocessing.R

The resulted tables:

The independent variables (31) and dependent variable (suicide\_rate) used in dataprocessing.r are:

1. analysis1 table (with area name)
2. analysis\_final\_new table (without area name)

Week 7 (25 October – 31 October)

* Create ggplot for suicide rate based on gender (male and female) and year + area
* Create ggplot for suicide rate based on gender (male, female and persons) and year
* Create correlation matrices between variables
* Calculate fitted value 🡪 input the variables value to the equations
* Create ggplot for fitted value to actual value of suicide rate
* Calculate MAE, RMSE and Rsquared to see the best model
* Create prediction model and draw the plot
* Calculate and sort the most significance variables on suicide rate
* Produced importance variables on suicide rate

Week 8(1 November – 7 November)

* Create table with column names: Area Name, Indicator ID 1, Indicator ID 2, etc
* Create table with column names: Area ID, Area Name, Indicator ID 1, Indicator ID 2, etc
* Create Indicator ID-Indicator table for reference

Produced m9 table contains of: AreaID, AreaName, IndicatorID (34)

Week9 Reading week (8 November – 14 November)

Work on the draft of the final paper

Week 10 (15 November – 21 November)

Conduct factor analysis, the results are in the table shown below

Results:

Multiple Linear Regression (coefficients are sorted)

|  |  |
| --- | --- |
| **Indicator** | **Coefficient** |
| `Estimated prevalence of common mental disorders: % of population aged 65 & over\_65+ yrs\_Persons` | 12.08689416 |
| `Mental Health: QOF prevalence (all ages)\_All ages\_Persons` | 4.378776439 |
| `Adults in treatment at specialist drug misuse services: rate per 1000 population\_18+ yrs\_Persons` | 1.47072257 |
| `Marital breakup: % of adults\_18+ yrs\_Persons` | 1.428965251 |
| `Adults in treatment at specialist alcohol misuse services: rate per 1000 population\_18+ yrs\_Persons` | 1.184669242 |
| `Older people living alone: % of households occupied by a single person aged 65 or over\_65+ yrs\_Persons` | 0.840570556 |
| `Emergency Hospital Admissions for Intentional Self-Harm\_All ages\_Persons` | 0.386866829 |
| `Unemployment (model-based)\_16+ yrs\_Persons` | 0.262807421 |
| `Long-term health problem or disability: % of population\_All ages\_Persons` | 0.246600386 |
| `Social Isolation: percentage of adult carers who have as much social contact as they would like\_18+ yrs\_Persons` | 0.123091282 |
| `Successful completion of alcohol treatment\_18+ yrs\_Persons` | 0.093595094 |
| `Successful completion of drug treatment - non-opiate users\_18+ yrs\_Persons` | 0.023150345 |
| `Admission episodes for alcohol-related conditions (Broad): Old Method\_All ages\_Persons` | 0.021063819 |
| `Children in care\_<18 yrs\_Persons` | 0.010110135 |
| `Long term claimants of Jobseeker's Allowance\_16-64 yrs\_Persons` | 0.006855004 |
| `Children leaving care: rate per 10,000 children aged under 18\_<18 yrs\_Persons` | 0.006278076 |
| `Social Isolation: percentage of adult carers who have as much social contact as they would like\_65+ yrs\_Persons` | 0.005628362 |
| `Admission episodes for alcohol-related conditions (Broad): Old Method\_All ages\_Male` | -0.012008835 |
| `Admission episodes for alcohol-related conditions (Broad): Old Method\_All ages\_Female` | -0.013099296 |
| `Social Isolation: percentage of adult carers who have as much social contact as they would like\_18-64 yrs\_Persons` | -0.020703138 |
| `Children in the youth justice system (10-17 yrs)\_10-17 yrs\_Persons` | -0.028814498 |
| `Social Isolation: percentage of adult carers who have as much social contact as they would like\_All ages\_Persons` | -0.04253679 |
| `Self-reported wellbeing - people with a high anxiety score\_16+ yrs\_Persons` | -0.107666507 |
| `Emergency Hospital Admissions for Intentional Self-Harm\_All ages\_Male` | -0.169290448 |
| `Estimated prevalence of opiate and/or crack cocaine use\_15-64 yrs\_Persons` | -0.171873474 |
| `Successful completion of drug treatment - opiate users\_18+ yrs\_Persons` | -0.18353718 |
| `Emergency Hospital Admissions for Intentional Self-Harm\_All ages\_Female` | -0.187550606 |
| `Social Isolation: percentage of adult social care users who have as much social contact as they would like\_18+ yrs\_Persons` | -0.323564467 |
| `Depression: Recorded prevalence (aged 18+)\_18+ yrs\_Persons` | -0.336023524 |
| `People living alone: % of all usual residents in households occupied by a single person\_All ages\_Persons` | -0.534240784 |
| `Estimated prevalence of common mental disorders: % of population aged 16 & over\_16+ yrs\_Persons` | -7.385760068 |

Linear Regression analyse one-by-one in initial order

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No** | **Indicator ID** | **Indicator name** | **Coefficient** | **p-Value** | **Sig. <0.05** |
| 1 |  | `Admission episodes for alcohol-related conditions (Broad): Old Method\_All ages\_Female` | 0.004578 | 0.03852 | Yes |
| 2 |  | `Admission episodes for alcohol-related conditions (Broad): Old Method\_All ages\_Male` | 8.319e-04 | 0.4518 | No |
| 3 |  | `Admission episodes for alcohol-related conditions (Broad): Old Method\_All ages\_Persons` | 0.002052 | 0.1795 | No |
| 4 |  | `Adults in treatment at specialist alcohol misuse services: rate per 1000 population\_18+ yrs\_Persons` | 6.263 | 7.421e-09 | Yes |
| 5 |  | `Adults in treatment at specialist drug misuse services: rate per 1000 population\_18+ yrs\_Persons` | 1.5611 | 2.083e-06 | Yes |
| 6 |  | `Children in care\_<18 yrs\_Persons` | 0.1252 | 3.055e-09 | Yes |
| 7 |  | `Children in the youth justice system (10-17 yrs)\_10-17 yrs\_Persons` | -0.1415 | 0.6609 | No |
| 8 |  | `Children leaving care: rate per 10,000 children aged under 18\_<18 yrs\_Persons` | 0.04555 | 0.3887 | No |
| 9 |  | `Depression: Recorded prevalence (aged 18+)\_18+ yrs\_Persons` | 1.6814 | 9.262e-10 | Yes |
| 10 |  | `Emergency Hospital Admissions for Intentional Self-Harm\_All ages\_Female` | 0.041093 | 6.673e-11 | Yes |
| 11 |  | `Emergency Hospital Admissions for Intentional Self-Harm\_All ages\_Male` | 0.071827 | 7.845e-14 | Yes |
| 12 |  | `Emergency Hospital Admissions for Intentional Self-Harm\_All ages\_Persons` | 0.055727 | 1.14e-12 | Yes |
| 13 |  | `Estimated prevalence of common mental disorders: % of population aged 16 & over\_16+ yrs\_Persons` | -0.1233 | 0.6682 | No |
| 14 |  | `Estimated prevalence of common mental disorders: % of population aged 65 & over\_65+ yrs\_Persons` | 0.664 | 0.6639 | No |
| 15 |  | `Estimated prevalence of opiate and/or crack cocaine use\_15-64 yrs\_Persons` | 0.6320 | 0.001504 | Yes |
| 16 |  | `Long-term health problem or disability: % of population\_All ages\_Persons` | 1.7518 | < 2.2e-16 | Yes |
| 17 |  | `Long term claimants of Jobseeker's Allowance\_16-64 yrs\_Persons` | 0.7403 | 0.04014 | Yes |
| 18 |  | `Marital breakup: % of adults\_18+ yrs\_Persons` | 7.377 | 1.21e-11 | Yes |
| 19 |  | `Mental Health: QOF prevalence (all ages)\_All ages\_Persons` | -0.2132 | 0.9572 | No |
| 20 |  | `People living alone: % of all usual residents in households occupied by a single person\_All ages\_Persons` | 8.266 | 8.593e-14 | Yes |
| 21 |  | `Self-reported wellbeing - people with a high anxiety score\_16+ yrs\_Persons` | 1.0327 | 0.002597 | Yes |
| 22 |  | `Social Isolation: percentage of adult carers who have as much social contact as they would like\_18-64 yrs\_Persons` | -0.006432 | 0.9812 | No |
| 23 |  | `Social Isolation: percentage of adult carers who have as much social contact as they would like\_18+ yrs\_Persons` | 0.387 | 0.3868 | No |
| 24 |  | `Social Isolation: percentage of adult carers who have as much social contact as they would like\_18+ yrs\_Persons` | 1.899 | 0.05956 | No |
| 25 |  | `Social Isolation: percentage of adult carers who have as much social contact as they would like\_65+ yrs\_Persons` | 2.773 | 0.006297 | Yes |
| 26 |  | `Social Isolation: percentage of adult carers who have as much social contact as they would like\_All ages\_Persons` | 0.2580 | 0.01289 | Yes |
| 27 |  | `Social Isolation: percentage of adult social care users who have as much social contact as they would like\_18+ yrs\_Persons` | 0.5344 | 0.002105 | Yes |
| 28 |  | `Successful completion of alcohol treatment\_18+ yrs\_Persons` | -0.1519 | 0.093 | No |
| 29 |  | `Successful completion of drug treatment - non-opiate users\_18+ yrs\_Persons` | -0.13108 | 0.106 | No |
| 30 |  | `Successful completion of drug treatment - opiate users\_18+ yrs\_Persons` | -1.0901 | 0.006836 | Yes |
| 31 |  | `Unemployment (model-based)\_16+ yrs\_Persons` | 0.2338 | 0.6304 | No |

Standardized Multiple Linear Regression (coefficients are sorted)

|  |  |
| --- | --- |
| **Variables** | **Coefficient** |
| `Emergency Hospital Admissions for Intentional Self-Harm\_All ages\_Persons` | 3.794797 |
| `Estimated prevalence of common mental disorders: % of population aged 65 & over\_65+ yrs\_Persons` | 2.0584 |
| `Admission episodes for alcohol-related conditions (Broad): Old Method\_All ages\_Persons` | 1.150939 |
| `Adults in treatment at specialist drug misuse services: rate per 1000 population\_18+ yrs\_Persons` | 0.360171 |
| `Marital breakup: % of adults\_18+ yrs\_Persons` | 0.194371 |
| `Older people living alone: % of households occupied by a single person aged 65 or over\_65+ yrs\_Persons` | 0.189303 |
| `Mental Health: QOF prevalence (all ages)\_All ages\_Persons` | 0.09231 |
| `Social Isolation: percentage of adult carers who have as much social contact as they would like\_18+ yrs\_Persons` | 0.09116 |
| `Long-term health problem or disability: % of population\_All ages\_Persons` | 0.088713 |
| `Adults in treatment at specialist alcohol misuse services: rate per 1000 population\_18+ yrs\_Persons` | 0.086481 |
| `Successful completion of alcohol treatment\_18+ yrs\_Persons` | 0.086268 |
| `Unemployment (model-based)\_16+ yrs\_Persons` | 0.04529 |
| `Children in care\_<18 yrs\_Persons` | 0.037748 |
| `Successful completion of drug treatment - non-opiate users\_18+ yrs\_Persons` | 0.023808 |
| `Children leaving care: rate per 10,000 children aged under 18\_<18 yrs\_Persons` | 0.009939 |
| `Social Isolation: percentage of adult carers who have as much social contact as they would like\_65+ yrs\_Persons` | 0.004413 |
| `Long term claimants of Jobseeker's Allowance\_16-64 yrs\_Persons` | 0.00158 |
| `Children in the youth justice system (10-17 yrs)\_10-17 yrs\_Persons` | -0.00748 |
| `Social Isolation: percentage of adult carers who have as much social contact as they would like\_18-64 yrs\_Persons` | -0.01703 |
| `Self-reported wellbeing - people with a high anxiety score\_16+ yrs\_Persons` | -0.03312 |
| `Social Isolation: percentage of adult carers who have as much social contact as they would like\_All ages\_Persons` | -0.03398 |
| `Successful completion of drug treatment - opiate users\_18+ yrs\_Persons` | -0.03766 |
| `Estimated prevalence of opiate and/or crack cocaine use\_15-64 yrs\_Persons` | -0.07104 |
| `Depression: Recorded prevalence (aged 18+)\_18+ yrs\_Persons` | -0.0961 |
| `People living alone: % of all usual residents in households occupied by a single person\_All ages\_Persons` | -0.12848 |
| `Social Isolation: percentage of adult social care users who have as much social contact as they would like\_18+ yrs\_Persons` | -0.1534 |
| `Admission episodes for alcohol-related conditions (Broad): Old Method\_All ages\_Female` | -0.49233 |
| `Admission episodes for alcohol-related conditions (Broad): Old Method\_All ages\_Male` | -0.90897 |
| `Emergency Hospital Admissions for Intentional Self-Harm\_All ages\_Male` | -1.34197 |
| `Estimated prevalence of common mental disorders: % of population aged 16 & over\_16+ yrs\_Persons` | -2.15004 |
| `Emergency Hospital Admissions for Intentional Self-Harm\_All ages\_Female` | -2.32023 |

Correlation matrix

On excel files

1. cor\_new\_marked (with Suicide\_Rate variable)
2. cor\_factor\_new (without Suicide\_Rate variable)

Conclusion on top 6 most influenced variables based on 4 statistics analyses (blank: `Estimated prevalence of common mental disorders: % of population aged 65 & over\_65+ yrs\_Persons`)

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **Multiple Linear Regression** | **One-by-one Linear Regression** | **Standardized Multiple Linear Regression** |
| 1 | `Estimated prevalence of common mental disorders: % of population aged 65 & over\_65+ yrs\_Persons` | `People living alone: % of all usual residents in households occupied by a single person\_All ages\_Persons` | `Emergency Hospital Admissions for Intentional Self-Harm\_All ages\_Persons` |
| 2 | `Mental Health: QOF prevalence (all ages)\_All ages\_Persons` | `Marital breakup: % of adults\_18+ yrs\_Persons` |  |
| 3 | `Adults in treatment at specialist drug misuse services: rate per 1000 population\_18+ yrs\_Persons` | `Adults in treatment at specialist alcohol misuse services: rate per 1000 population\_18+ yrs\_Persons` | `Admission episodes for alcohol-related conditions (Broad): Old Method\_All ages\_Persons` |
| 4 | `Marital breakup: % of adults\_18+ yrs\_Persons` | `Social Isolation: percentage of adult carers who have as much social contact as they would like\_65+ yrs\_Persons` | `Adults in treatment at specialist drug misuse services: rate per 1000 population\_18+ yrs\_Persons` |
| 5 | `Adults in treatment at specialist alcohol misuse services: rate per 1000 population\_18+ yrs\_Persons` | `Long-term health problem or disability: % of population\_All ages\_Persons` | `Marital breakup: % of adults\_18+ yrs\_Persons` |
| 6 | `Older people living alone: % of households occupied by a single person aged 65 or over\_65+ yrs\_Persons` | `Depression: Recorded prevalence (aged 18+)\_18+ yrs\_Persons` | `Older people living alone: % of households occupied by a single person aged 65 or over\_65+ yrs\_Persons` |

Based on Conclusion table above, there are 2 variables consistently stated in 3 analyses:

1. `Adults in treatment at specialist drug misuse services: rate per 1000 population\_18+ yrs\_Persons`
2. `Marital breakup: % of adults\_18+ yrs\_Persons`
3. `Adults in treatment at specialist alcohol misuse services: rate per 1000 population\_18+ yrs\_Persons`

And 2 variables consistently stated in 2 analyses:

1. `Estimated prevalence of common mental disorders: % of population aged 65 & over\_65+ yrs\_Persons
2. `Older people living alone: % of households occupied by a single person aged 65 or over\_65+ yrs\_Persons`

Week 10 (15 November – 21 November)

Factor Analysis result:

There are 7 factors consist of 31 variables:

$Factor1

[1] "Children in care\_<18 yrs\_Persons"

[2] "Children leaving care: rate per 10,000 children aged under 18\_<18 yrs\_Persons"

[3] "Children in the youth justice system (10-17 yrs)\_10-17 yrs\_Persons"

[4] "Unemployment (model-based)\_16+ yrs\_Persons"

[5] "Long term claimants of Jobseeker's Allowance\_16-64 yrs\_Persons"

[6] "Adults in treatment at specialist drug misuse services: rate per 1000 population\_18+ yrs\_Persons"

[7] "Mental Health: QOF prevalence (all ages)\_All ages\_Persons"

[8] "Estimated prevalence of opiate and/or crack cocaine use\_15-64 yrs\_Persons"

[9] "Estimated prevalence of common mental disorders: % of population aged 65 & over\_65+ yrs\_Persons"

[10] "Estimated prevalence of common mental disorders: % of population aged 16 & over\_16+ yrs\_Persons"

$Factor2

[1] "Social Isolation: percentage of adult social care users who have as much social contact as they would like\_18+ yrs\_Persons"

[2] "Depression: Recorded prevalence (aged 18+)\_18+ yrs\_Persons"

[3] "Marital breakup: % of adults\_18+ yrs\_Persons"

[4] "Long-term health problem or disability: % of population\_All ages\_Persons"

[5] "Older people living alone: % of households occupied by a single person aged 65 or over\_65+ yrs\_Persons"

[6] "Adults in treatment at specialist alcohol misuse services: rate per 1000 population\_18+ yrs\_Persons"

$Factor3

[1] "Emergency Hospital Admissions for Intentional Self-Harm\_All ages\_Persons"

[2] "Emergency Hospital Admissions for Intentional Self-Harm\_All ages\_Female"

[3] "Emergency Hospital Admissions for Intentional Self-Harm\_All ages\_Male"

$Factor4

[1] "Social Isolation: percentage of adult carers who have as much social contact as they would like\_18+ yrs\_Persons"

[2] "Social Isolation: percentage of adult carers who have as much social contact as they would like\_All ages\_Persons"

[3] "Social Isolation: percentage of adult carers who have as much social contact as they would like\_18-64 yrs\_Persons"

[4] "Social Isolation: percentage of adult carers who have as much social contact as they would like\_65+ yrs\_Persons"

$Factor5

[1] "Admission episodes for alcohol-related conditions (Broad): Old Method\_All ages\_Female"

[2] "Admission episodes for alcohol-related conditions (Broad): Old Method\_All ages\_Persons"

[3] "Admission episodes for alcohol-related conditions (Broad): Old Method\_All ages\_Male"

$Factor6

[1] "Successful completion of alcohol treatment\_18+ yrs\_Persons"

[2] "Successful completion of drug treatment - non-opiate users\_18+ yrs\_Persons"

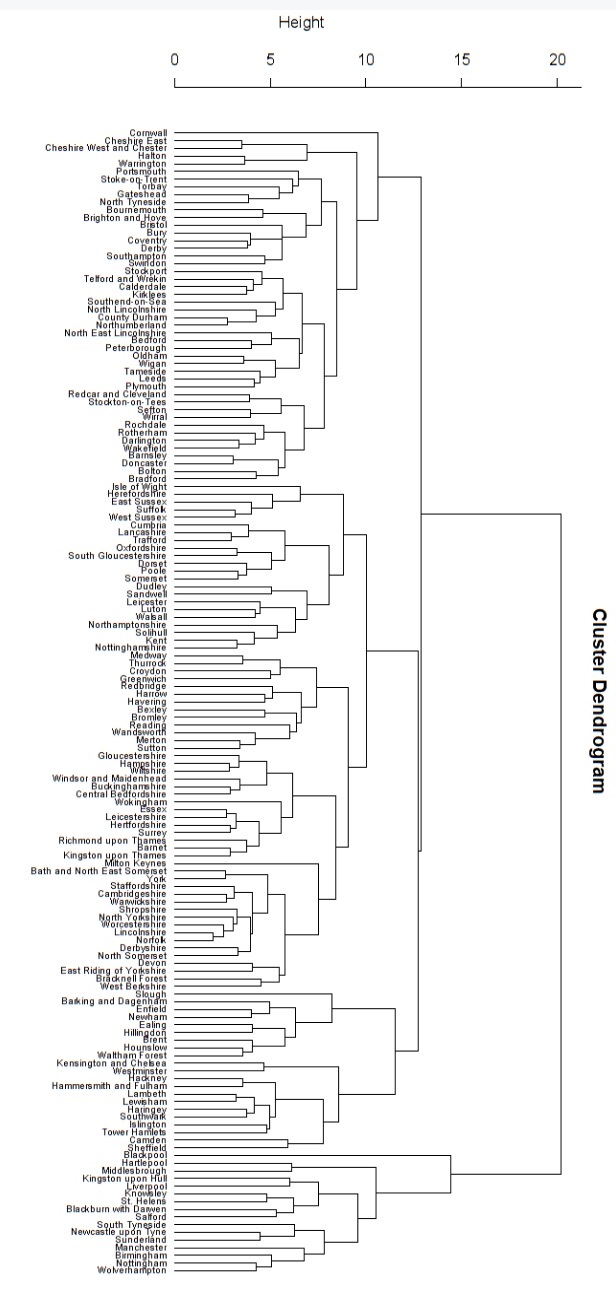
[3] "Successful completion of drug treatment - opiate users\_18+ yrs\_Persons"

$Factor7

[1] "Self-reported wellbeing - people with a high anxiety score\_16+ yrs\_Persons"

[2] "People living alone: % of all usual residents in households occupied by a single person\_All ages\_Persons"

Hierarchical clustering



Hierarchical clustering result:

Areas is divided to 3-8 clusters in England. Determining the number of clusters is a hard task for humans to perform (unless the data are low-dimensional). Not only that, it’s just as hard to explain what it is we’re looking for.