Title Placeholder

Load in Specific Packages

```r
library(readr)
library(tidyr)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
## The following objects are masked from 'package:stats':
##
##     filter, lag
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```r
library(here)
```

```
## here() starts at C:/Users/romin/ToyRepo
```

```r
library(lemon)
```

```
## Warning: package 'lemon' was built under R version 4.4.2
```

```r
library(kableExtra)
```

```
## Warning: package 'kableExtra' was built under R version 4.4.2
##
## Attaching package: 'kableExtra'
## The following object is masked from 'package:dplyr':
##
##     group_rows
```

```r
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 4.4.2
```

```r
library(reshape())
```

```
## Warning: package 'reshape' was built under R version 4.4.2
##
## Attaching package: 'reshape'
## The following object is masked from 'package:dplyr':
##
##     rename
## The following objects are masked from 'package:tidyr':
##
##     expand, smiths
```

```r
library(hexbin)
```

```
## Warning: package 'hexbin' was built under R version 4.4.2
```

```r
library(data.table)
```

```
##
## Attaching package: 'data.table'
```

```
## The following object is masked from 'package:reshape':
##
##     melt
```

```
## The following objects are masked from 'package:dplyr':
##
##     between, first, last
```

```r
library(GGally)
```

```
## Warning: package 'GGally' was built under R version 4.4.2
```

```
## Registered S3 method overwritten by 'GGally':
##   method from
##   +.gg   ggplot2
```

```r
library(formattable)
```

```
## Warning: package 'formattable' was built under R version 4.4.2
```

```r
library(viridis)
```

```
## Warning: package 'viridis' was built under R version 4.4.2
```

```
## Loading required package: viridisLite
```

```r
library(TTR)
```

```
## Warning: package 'TTR' was built under R version 4.4.2
```

```r
library(zoo)
```

```
## Warning: package 'zoo' was built under R version 4.4.2
```

```
##
## Attaching package: 'zoo'
```

```
## The following objects are masked from 'package:data.table':
##
##     yearmon, yearqtr
```

```
## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric
```

```r
library(ggrepel)
```

```
## Warning: package 'ggrepel' was built under R version 4.4.2
```

Load in the data

```r
cancerReg <- read.csv("C:\\Users\\romin\\ToyRepo\\Models\\cancerReg.csv")
```

Remove Uncessary Data for Analysis

```r
cancerReg <- cancerReg %>% select(-period,-area_type,-type_definition,-indicator, -upper_confidence_int
```

Display Summary of All Data

```r
# ggplot(cancerReg,aes(x=year, y= measure, col=area_name)) + geom_line() + geom_point()
# ggplot(cancerReg, aes(x=area_name, y=measure, fill=area_name)) + geom_violin()
# ggparcoord(data= cancerReg, columns = c(), groupColumn = "area_name")
# ggplot(cancerReg, aes(fill=year, y=measure, x=area_name)) + geom_bar(position = "stack", stat = "iden
# ggplot(cancerReg, aes(x = year, y = measure, fill = area_name)) +  geom_area(alpha=0.6 , size=.5, col
#     scale_fill_viridis(discrete = T)
# ggplot(cancerReg, aes(x = year, y = measure, col = area_name)) +
#     geom_point(size = 3, position = position_jitter(h = 0.50, w = 0.50), alpha = 0.5) +
#     geom_smooth(se=FALSE, size = 0.7 )


cancerReg <- cancerReg %>%
    arrange(year) %>%
    mutate(MA = rollmean(cancerReg$measure, k = 1, fill = NA, align = "right"))
finalValues <- cancerReg %>%
    group_by(area_name) %>%
    summarise(
        lastMA = dplyr::last(measure),
        lastYear=dplyr::last(year)
    )
finalValues
```

```
## # A tibble: 14 x 3
##     area_name                lastMA lastYear
##     <chr>                     <dbl>    <int>
##  1 NHS Ayrshire & Arran        626.     2020
##  2 NHS Borders                 560.     2020
##  3 NHS Dumfries & Galloway     622.     2020
##  4 NHS Fife                    602      2020
##  5 NHS Forth Valley            642.     2020
##  6 NHS Grampian                615.     2020
##  7 NHS Greater Glasgow & Clyde 674.     2020
##  8 NHS Highland                605.     2020
##  9 NHS Lanarkshire             624.     2020
## 10 NHS Lothian                 629.     2020
## 11 NHS Orkney                  587.     2020
## 12 NHS Shetland                552.     2020
## 13 NHS Tayside                 590.     2020
## 14 NHS Western Isles           666.     2020
```

```r
options(repr.plot.width =20, repr.plot.height =20)
subData <- cancerReg[seq(1, nrow(cancerReg), 14), ]
ggplot(cancerReg, aes(x = year)) +
    geom_pointline(aes(y = measure,method="lm", col = area_name), se = FALSE, size = 0.5, alpha = 0.5)
    # geom_text_repel(data = cancerReg, aes(y = measure, label = area_name), nudge_x = 1, na.rm = TRUE)
    geom_point(data = subData, aes(y = MA), color = "black", size = 2) +
    geom_line(data = subData, aes(y = MA), colour = "black", linetype = "dashed", size = 0.7) +
    geom_text_repel(data = finalValues, aes(
```

```
      x = lastYear,
      y = lastMA,
      label = area_name,
      color=area_name),
      size = 2.5,
      fontface = "bold",
      nudge_y = 7.6,
      direction = "y",
      hjust= -0.8,
      segment.linetype=2,
      segment.size = 0.5,
      segment.curvature=0
      ) +
    theme(legend.position = "none")
```

```
## Warning in geom_pointline(aes(y = measure, method = "lm", col = area_name), :
## Ignoring unknown parameters: `se`
```
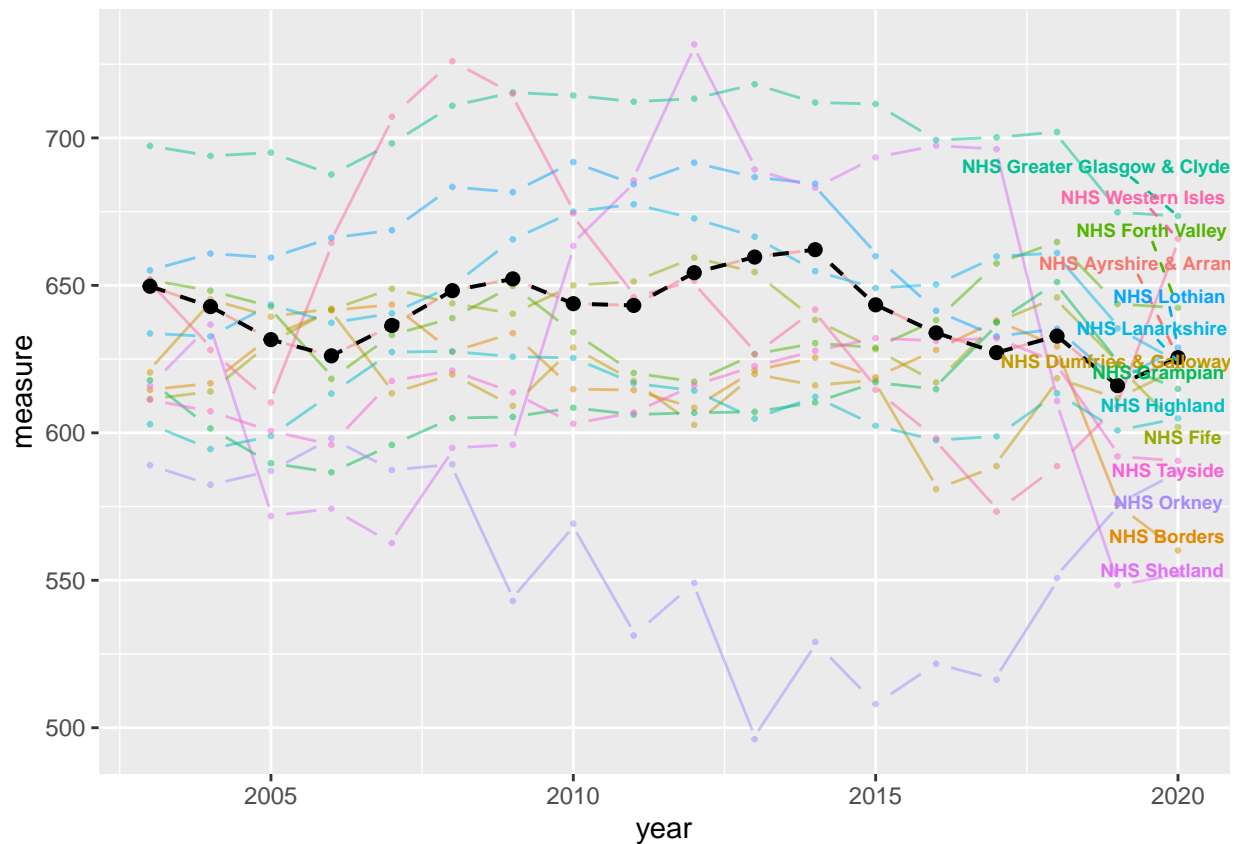
```
## Warning in geom_pointline(aes(y = measure, method = "lm", col = area_name), :
## Ignoring unknown aesthetics: method
```

```
## Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use `linewidth` instead.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```

```
# overallPlot <- overallPlot + geom_text_repel(data = finalValues, aes(x = lastYear, y = lastMA, label
# overallPlot
```

```
colourCells <- function(values, average){
    diffVal <- values - average
    if (diffVal>=0 & diffVal<=20){
        return(paste0("\\cellcolor{green!," ,round(diffVal/100), "}"))
    }
}
```

Summary Table of Data Within Graph

```
healthBoardData <- cancerReg %>%
    group_by(year) %>%
    mutate(Percent = measure / sum(measure) * 100)
healthBoardData <- cancerReg %>% pivot_wider(names_from = year, values_from = measure)
healthBoardData <- healthBoardData %>%
    mutate(
        Average = rowMeans(select(., `2003`:`2020`), na.rm = TRUE)
    )
kable(healthBoardData, format = "latex", booktabs = TRUE)
```

area_code	area_name	MA	2003	2004	2005	2006	2007	2008	2009	2010	201
S08000015	NHS Ayrshire & Arran	649.7	649.7	NA	NA	NA	NA	NA	NA	NA	N.
S08000016	NHS Borders	614.6	614.6	NA	NA	NA	NA	NA	NA	NA	N.
S08000017	NHS Dumfries & Galloway	620.5	620.5	NA	NA	NA	NA	NA	NA	NA	N.
S08000019	NHS Forth Valley	651.8	651.8	NA	NA	NA	NA	NA	NA	NA	N.
S08000020	NHS Grampian	617.8	617.8	NA	NA	NA	NA	NA	NA	NA	N.
S08000022	NHS Highland	602.9	602.9	NA	NA	NA	NA	NA	NA	NA	N.
S08000024	NHS Lothian	655.1	655.1	NA	NA	NA	NA	NA	NA	NA	N.
S08000025	NHS Orkney	589.0	589.0	NA	NA	NA	NA	NA	NA	NA	N.
S08000026	NHS Shetland	616.0	616.0	NA	NA	NA	NA	NA	NA	NA	N.
S08000028	NHS Western Isles	652.0	652.0	NA	NA	NA	NA	NA	NA	NA	N.
S08000029	NHS Fife	611.4	611.4	NA	NA	NA	NA	NA	NA	NA	N.
S08000030	NHS Tayside	611.2	611.2	NA	NA	NA	NA	NA	NA	NA	N.
S08000031	NHS Greater Glasgow & Clyde	697.3	697.3	NA	NA	NA	NA	NA	NA	NA	N.
S08000032	NHS Lanarkshire	633.7	633.7	NA	NA	NA	NA	NA	NA	NA	N.
S08000015	NHS Ayrshire & Arran	642.8	NA	642.8	NA	NA	NA	NA	NA	NA	N.
S08000016	NHS Borders	616.8	NA	616.8	NA	NA	NA	NA	NA	NA	N.
S08000017	NHS Dumfries & Galloway	645.2	NA	645.2	NA	NA	NA	NA	NA	NA	N.
S08000019	NHS Forth Valley	648.2	NA	648.2	NA	NA	NA	NA	NA	NA	N.
S08000020	NHS Grampian	601.5	NA	601.5	NA	NA	NA	NA	NA	NA	N.
S08000022	NHS Highland	594.5	NA	594.5	NA	NA	NA	NA	NA	NA	N.
S08000024	NHS Lothian	660.8	NA	660.8	NA	NA	NA	NA	NA	NA	N.
S08000025	NHS Orkney	582.4	NA	582.4	NA	NA	NA	NA	NA	NA	N.
S08000026	NHS Shetland	636.7	NA	636.7	NA	NA	NA	NA	NA	NA	N.
S08000028	NHS Western Isles	628.1	NA	628.1	NA	NA	NA	NA	NA	NA	N.
S08000029	NHS Fife	614.0	NA	614.0	NA	NA	NA	NA	NA	NA	N.
S08000030	NHS Tayside	607.3	NA	607.3	NA	NA	NA	NA	NA	NA	N.
S08000031	NHS Greater Glasgow & Clyde	693.9	NA	693.9	NA	NA	NA	NA	NA	NA	N.
S08000032	NHS Lanarkshire	632.7	NA	632.7	NA	NA	NA	NA	NA	NA	N.
S08000015	NHS Ayrshire & Arran	631.6	NA	NA	631.6	NA	NA	NA	NA	NA	N.
S08000016	NHS Borders	632.7	NA	NA	632.7	NA	NA	NA	NA	NA	N.
S08000017	NHS Dumfries & Galloway	639.4	NA	NA	639.4	NA	NA	NA	NA	NA	N.
S08000019	NHS Forth Valley	642.8	NA	NA	642.8	NA	NA	NA	NA	NA	N.
S08000020	NHS Grampian	589.7	NA	NA	589.7	NA	NA	NA	NA	NA	20
S08000022	NHS Highland	598.9	NA	NA	598.9	NA	NA	NA	NA	NA	N.
S08000024	NHS Lothian	659.4	NA	NA	659.4	NA	NA	NA	NA	NA	N.
S08000025	NHS Orkney	587.1	NA	NA	587.1	NA	NA	NA	NA	NA	N.
S08000026	NHS Shetland	571.8	NA	NA	571.8	NA	NA	NA	NA	NA	N.
S08000028	NHS Western Isles	610.3	NA	NA	610.3	NA	NA	NA	NA	NA	N.
S08000029	NHS Fife	630.7	NA	NA	630.7	NA	NA	NA	NA	NA	N.
S08000030	NHS Tayside	600.6	NA	NA	600.6	NA	NA	NA	NA	NA	N.
S08000031	NHS Greater Glasgow & Clyde	695.0	NA	NA	695.0	NA	NA	NA	NA	NA	N.
S08000032	NHS Lanarkshire	643.5	NA	NA	643.5	NA	NA	NA	NA	NA	N.
S08000015	NHS Ayrshire & Arran	626.1	NA	NA	NA	626.1	NA	NA	NA	NA	N.
S08000016	NHS Borders	641.5	NA	NA	NA	641.5	NA	NA	NA	NA	N.
S08000017	NHS Dumfries & Galloway	642.1	NA	NA	NA	642.1	NA	NA	NA	NA	N.
S08000019	NHS Forth Valley	618.3	NA	NA	NA	618.3	NA	NA	NA	NA	N.
S08000020	NHS Grampian	586.6	NA	NA	NA	586.6	NA	NA	NA	NA	N.
S08000022	NHS Highland	613.3	NA	NA	NA	613.3	NA	NA	NA	NA	N.
S08000024	NHS Lothian	666.1	NA	NA	NA	666.1	NA	NA	NA	NA	N.
S08000025	NHS Orkney	598.1	NA	NA	NA	598.1	NA	NA	NA	NA	N.
S08000026	NHS Shetland	574.3	NA	NA	NA	574.3	NA	NA	NA	NA	N.
S08000028	NHS Western Isles	664.4	NA	NA	NA	664.4	NA	NA	NA	NA	N.
S08000029	NHS Fife	641.7	NA	NA	NA	641.7	NA	NA	NA	NA	N.
S08000030	NHS Tayside	596.0	NA	NA	NA	596.0	NA	NA	NA	NA	N.
S08000031	NHS Greater Glasgow & Clyde	687.6	NA	NA	NA	687.6	NA	NA	NA	NA	N.

```
healthBoardData
```

```
## # A tibble: 251 x 22
##    area_code area_name      MA `2003` `2004` `2005` `2006` `2007` `2008` `2009`
##    <chr>     <chr>       <dbl>  <dbl>  <dbl>  <dbl>  <dbl>  <dbl>  <dbl>  <dbl>
##  1 S08000015 NHS Ayrshir~ 650.   650.    NA     NA     NA     NA     NA     NA
##  2 S08000016 NHS Borders  615.   615.    NA     NA     NA     NA     NA     NA
##  3 S08000017 NHS Dumfrie~ 620.   620.    NA     NA     NA     NA     NA     NA
##  4 S08000019 NHS Forth V~ 652.   652.    NA     NA     NA     NA     NA     NA
##  5 S08000020 NHS Grampian 618.   618.    NA     NA     NA     NA     NA     NA
##  6 S08000022 NHS Highland 603.   603.    NA     NA     NA     NA     NA     NA
##  7 S08000024 NHS Lothian  655.   655.    NA     NA     NA     NA     NA     NA
##  8 S08000025 NHS Orkney   589    589     NA     NA     NA     NA     NA     NA
##  9 S08000026 NHS Shetland 616    616     NA     NA     NA     NA     NA     NA
## 10 S08000028 NHS Western~ 652    652     NA     NA     NA     NA     NA     NA
## # i 241 more rows
## # i 12 more variables: `2010` <dbl>, `2011` <dbl>, `2012` <dbl>, `2013` <dbl>,
## #   `2014` <dbl>, `2015` <dbl>, `2016` <dbl>, `2017` <dbl>, `2018` <dbl>,
## #   `2019` <dbl>, `2020` <dbl>, Average <dbl>
```

#Note for next time: what I want to do at this point is to show the changing colours as a difference change if its only within a small amount of chaning values then ignore the calues and do not #colour the cell, otherwise red fir a rise and green for a fall