

# Diagnostic atlas of variation

## Introduction

```
knitr::opts_chunk$set(cache = TRUE, echo = FALSE, warning = FALSE, message = FALSE)
```

```
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
```

```
library(ggplot2)
```

```
library(govstyle)
```

```
if(!require("factoextra"))install.packages("factoextra")
```

```
## Loading required package: factoextra
```

```
library(factoextra)
```

```
if(!require("FactoMineR"))install.packages("FactoMineR")
```

```
## Loading required package: FactoMineR
```

```
library(FactoMineR)
```

```
gov_cols
```

```
##      purple      pink mellow_red      yellow turquoise      mauve
##      "#2E358B"    "#D53880"    "#DF3034"    "#FFBF47"    "#28A197"    "#6F72AF"
##      baby_pink    orange      green light_blue      fuschia      red
##      "#F499BE"    "#F47738"    "#006435"    "#2B8CC4"    "#912B88"    "#B10E1E"
##      brown grass_green
##      "#B58840"    "#85994B"
```

Created a file of CCG data from the Diagnostic Atlas of Variation

## Structure of the data

The file contains:

1. Data for 17 CCG maps
2. Three type of time periods - quarterly, annual and three yearly

This is summarised in table 1.

Period	Map 1: Rate of computed axial tomography (CT) activity per weighted population by CCG	Map 16: Rate
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Period	Map 1: Rate of computed axial tomography (CT) activity per weighted population by CCG	Map 16: Rate
0506-0708		NA
0607-0809		NA
0708-0910		NA
0809-1011		NA
0910-1112		NA
1011-1213		NA
1112-1314		NA
1213-1415		NA
2005/06		NA
2006/07		NA
2007/08		NA
2008/09		NA
2009/10		NA
2010/11		NA
2011/12		NA
2012/13		NA
2013/14		210
2013/14_Q1		210
2013/14_Q2		210
2013/14_Q3		210
2013/14_Q4		210
2014/15		210
2014/15_Q1		210
2014/15_Q2		210
2014/15_Q3		210
2014/15_Q4		210
2015/16		210
2015/16_Q1		210
2015/16_Q2		210
2015/16_Q3		210
2015/16_Q4		210

## Comparison of endoscopic procedures

I am going to compare rates of utilisation of radiological, endoscopic and related procedures - these are included in maps 16, 17, 19, 20 and 22.

```
## # A tibble: 6 × 10
##   Period `CCG code`      `CCG name`
##   <chr>   <chr>         <chr>
## 1 2013/14_Q1 E92000001          ENGLAND
## 2 2013/14_Q1 E38000212      NHS Newcastle Gateshead CCG
## 3 2013/14_Q1 E38000042          NHS Darlington
## 4 2013/14_Q1 E38000047 NHS Durham Dales, Easington and Sedgefield
## 5 2013/14_Q1 E38000116          NHS North Durham
## 6 2013/14_Q1 E38000075      NHS Hartlepool and Stockton-on-Tees
```

```
## # ... with 7 more variables: Rate <dbl>, `95% lower` <dbl>, `95%
## #   upper` <dbl>, `99.8% lower` <dbl>, `99.8% upper` <dbl>, Sigband <int>,
## #   map <chr>
```

Plot trends

## Correlations

```
##           rowname X2014.15...Map.22..R X2014.15...Map.16..R
## 1 X2014.15...Map.22..R                      .21
## 2 X2014.15...Map.16..R                      .21
## 3 X2014.15...Map.19..R                      .32          .72
## 4 X2014.15...Map.17..R                      .03          .15
## 5 X2015.16...Map.2..Ra                     -.03          .04
## 6 X2014.15...Map.20..P                     -.09          .02
## 7 X2015.16...Map.1..Ra                      .21          .17
##   X2014.15...Map.19..R X2014.15...Map.17..R X2015.16...Map.2..Ra
## 1                      .32          .03          -.03
## 2                      .72          .15          .04
## 3                      .19          .19          .00
## 4                      .19          .19          -.05
## 5                      .00          -.05          .00
## 6                      .12          -.18          -.05
## 7                      .21          .19          .35
##   X2014.15...Map.20..P X2015.16...Map.1..Ra
## 1                      -.09          .21
## 2                      .02          .17
## 3                      .12          .21
## 4                      -.18          .19
## 5                      -.05          .35
## 6                      .00          -.37
## 7                      -.37          .00
## [1] 0
```

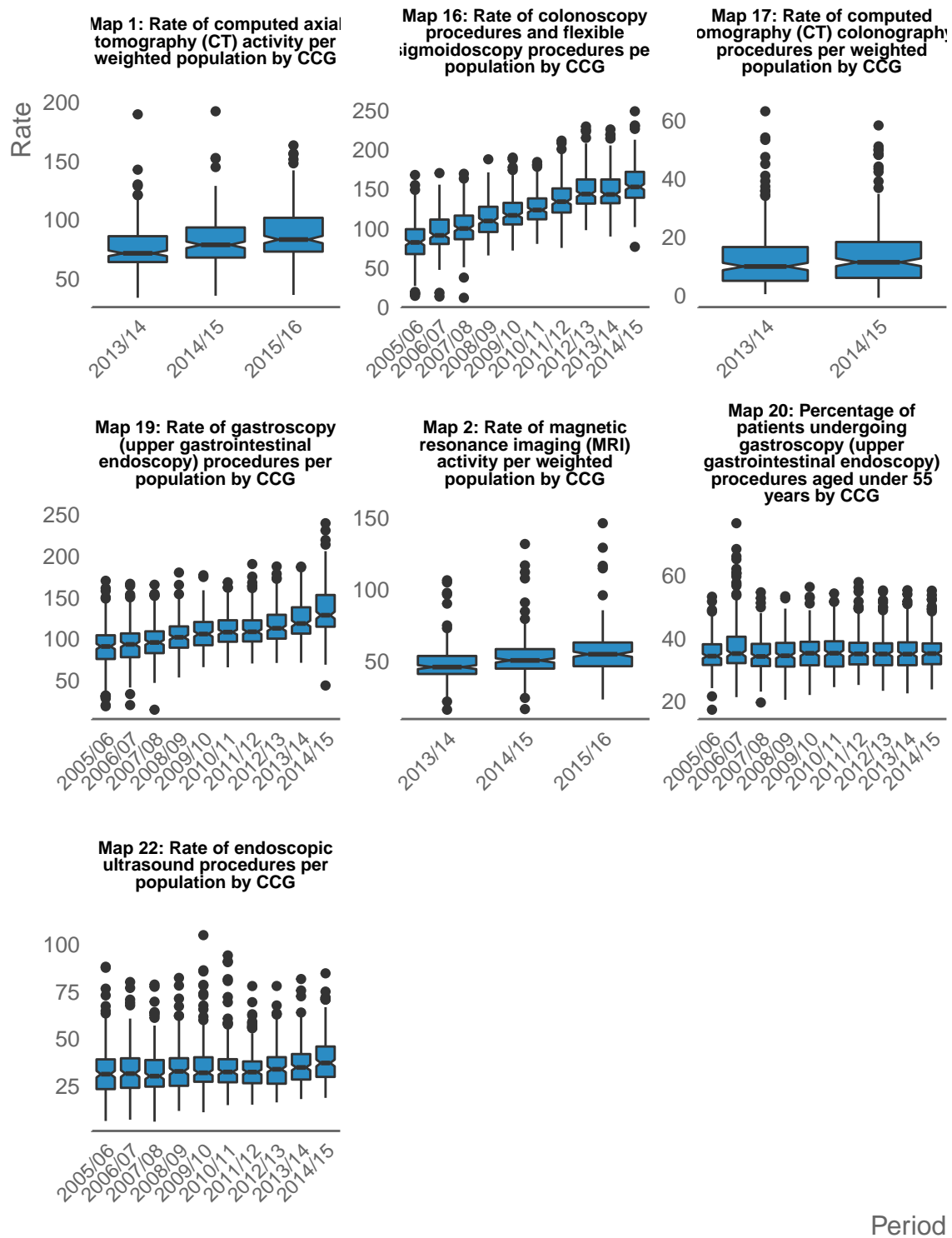


Figure 1: Trends in rates of endoscopy and imaging

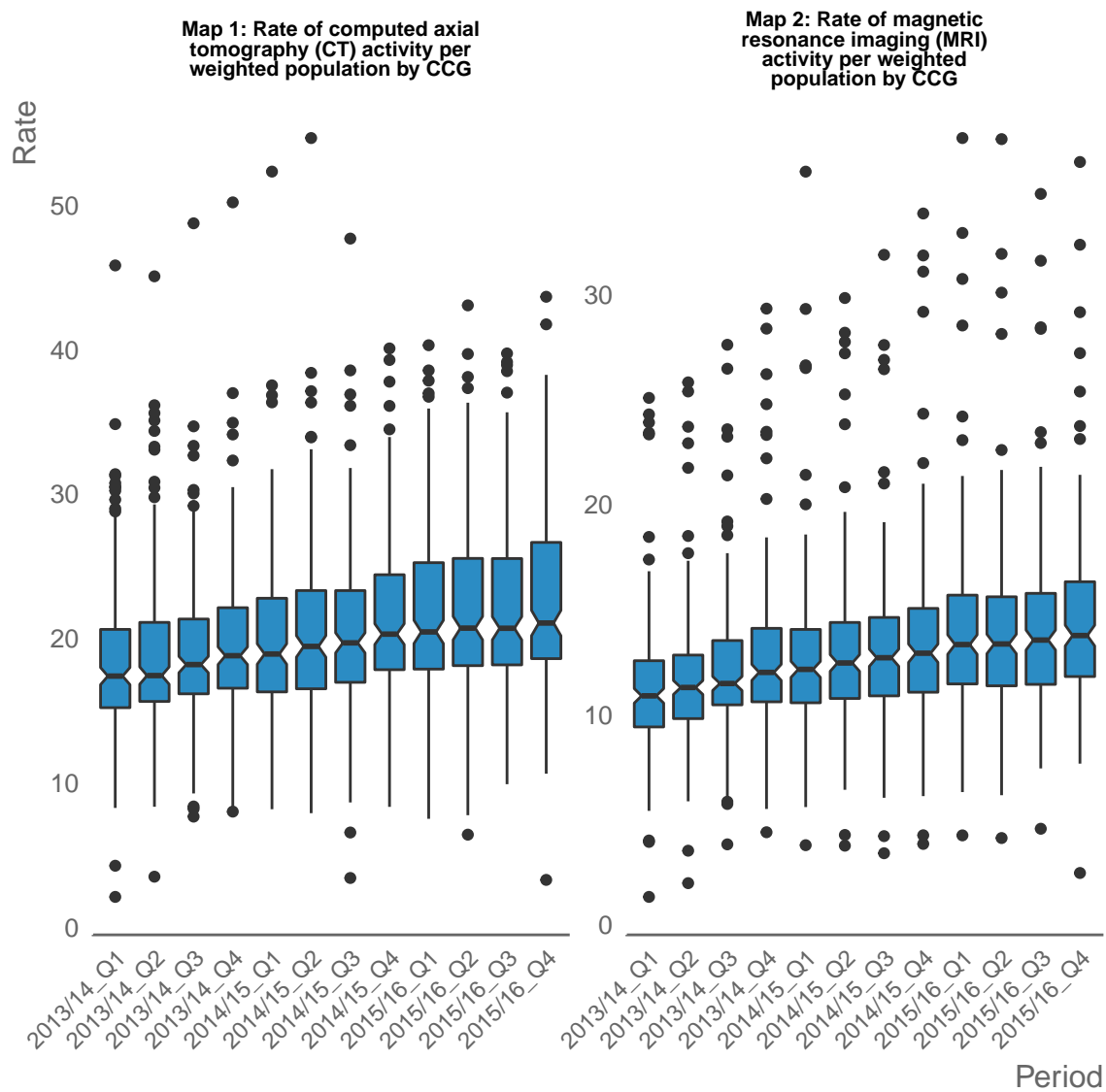
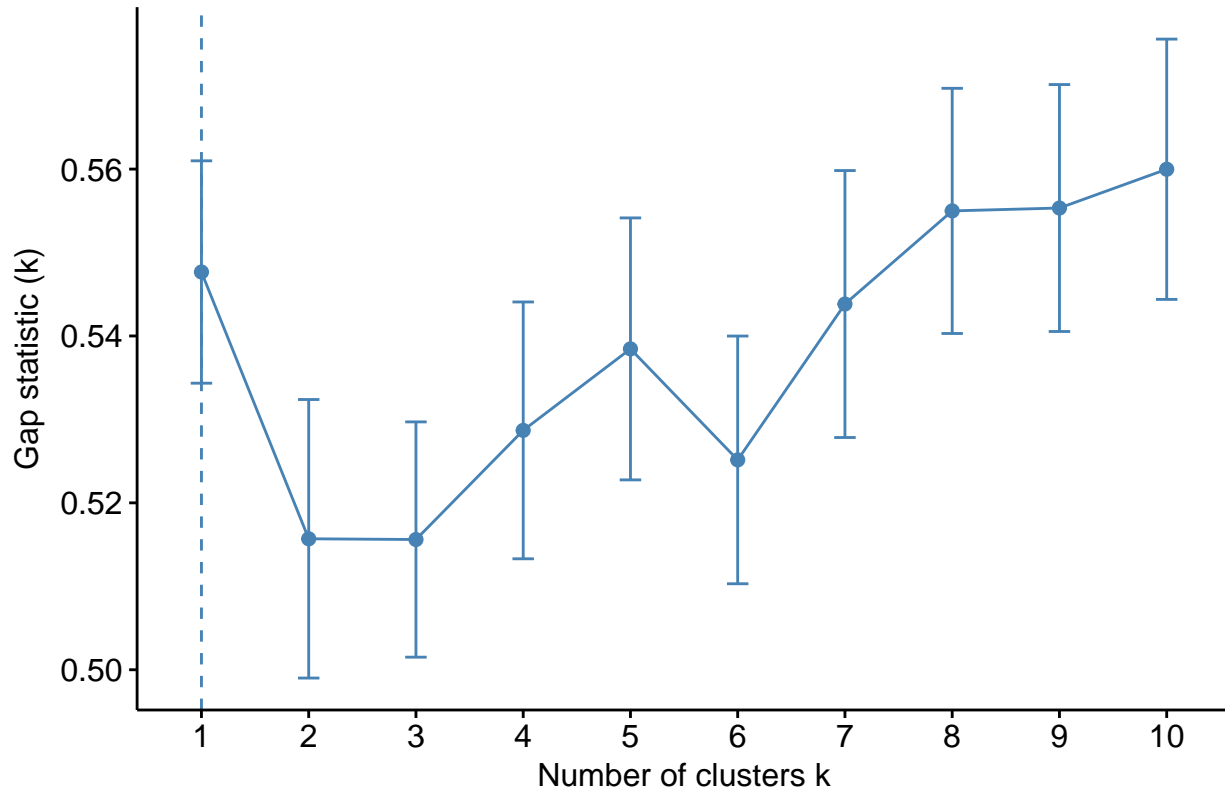
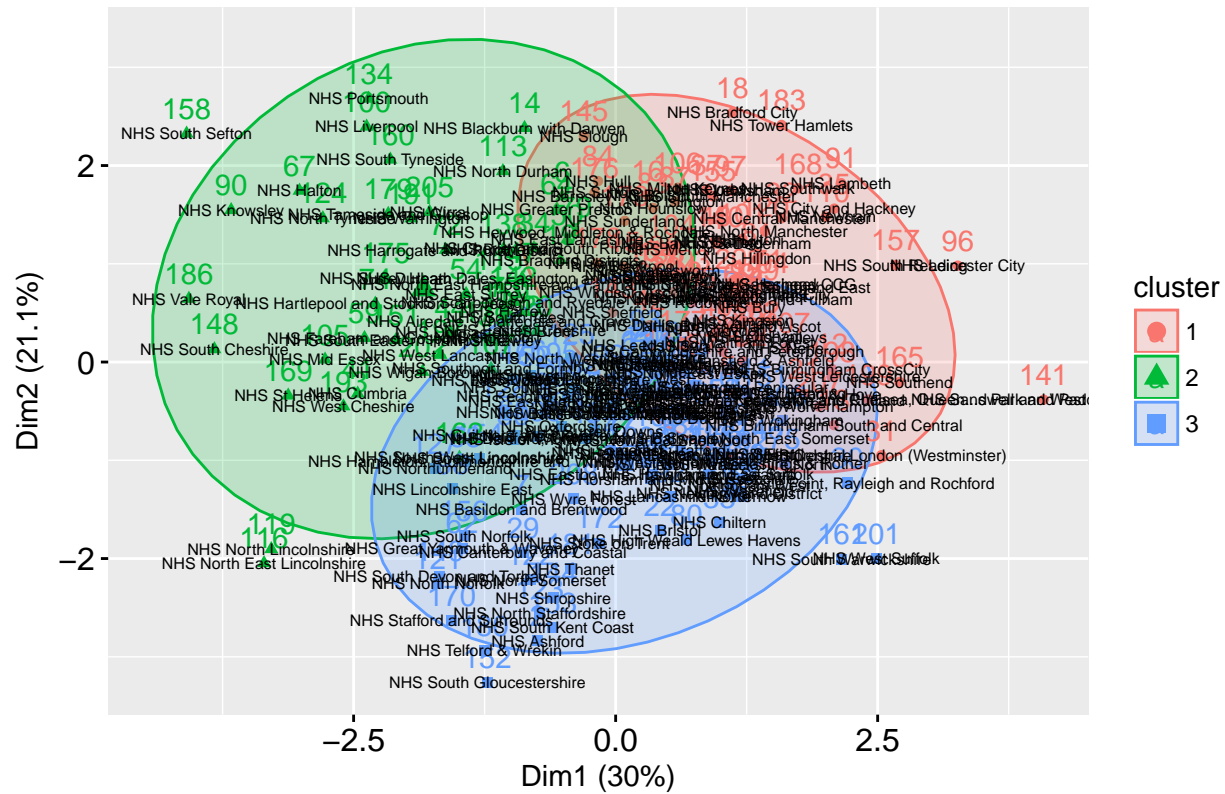


Figure 2: Trends in rates of endoscopy and imaging - quarterly data

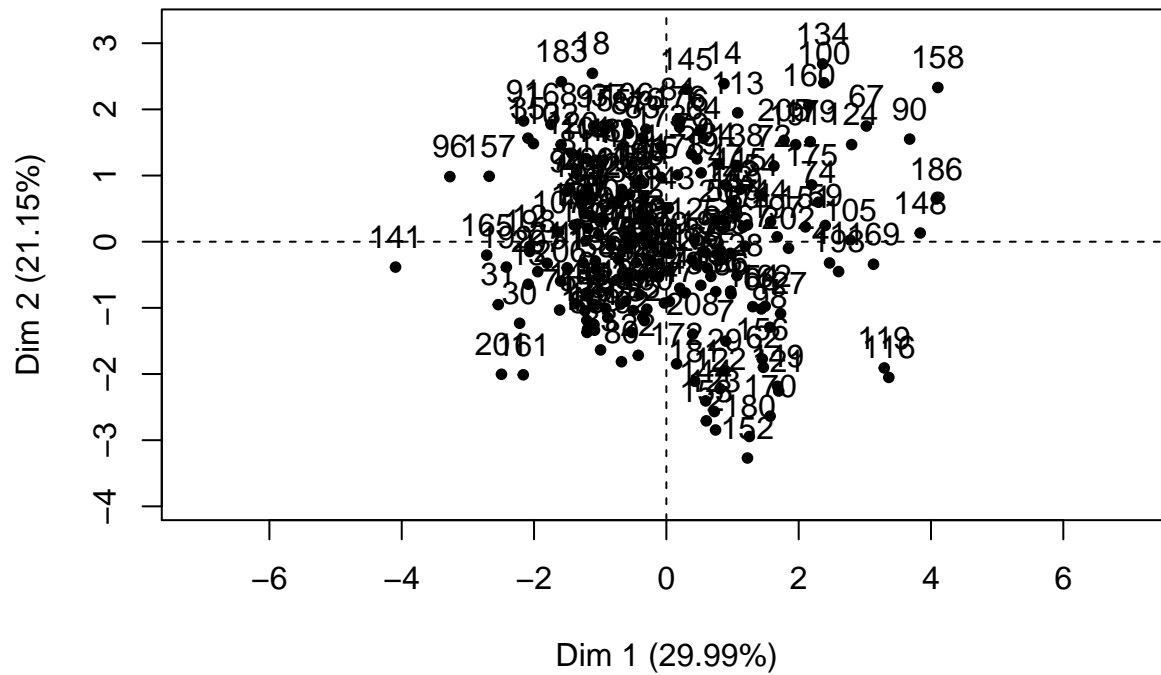
Optimal number of clusters



Cluster plot



**Individuals factor map (PCA)**



**Variables factor map (PCA)**

