

**Case Studies in Government Analytics**

**Assignment 3**

**Task-2 Analysis of “OP Waiting List”**

**Group Members:**

**Surya Balakrishnan Ramakrishnan (18231072)**  
**Sai Krishna Lakshminarayanan (18230229)**

## **Descriptions of packages/algorithms:**

- **ckanr:** The ckanr package has been used to extract the dataset from the data.gov.ie webpage. The CKAN for R comes bundled with the CKAN API which is responsible for fetching the dataset.
- **dplyr and tidyr and tidyverse:** The dplyr package along with the tidyr and tidyverse package is known as the grammar for data manipulation. These packages contain a set of functions which can be useful for data manipulation. The functions from these packages which are used are %>% (mygritr), select(), summarise(), group\_by(). The mygritr function offers a set of operators which help to reduce the amount of coding making the process of coding easy. The select function is used to select a specific required column from a data frame. Summarise function generates the summary statistics of a particular column like sum, average, etc. group\_by function is used to gather the data by grouping them by either one or more column from a data frame.
- **ggplot2:** The ggplot2 package abbreviation for grammar for graphics is the backbone behind the Visualisation of data in R. ggplot2 helps to create complex and powerful plots for uni and multi variable numerical and categorical data. The types of plots used in this assignment includes, bar plot, stacked bar plot, line plot, faceted bar plot.
- **RColourBrewer:** The RColourBrewer is a package which as its name says contains a set of predefined colour patterns which can be used to our advantage to make the different data points coherent and differentiable.
- **lubridate:** The lubridate package is used to manipulate the date datatype. This package helps to convert the date variable into any date or time format which is deemed suitable for the given use case.
- **scales and ggridges:** The scales and ggridges packages are used to modify the different properties such as the scales and other properties related to the plot. The ggridges package provides a convenient way to visualise changes in distributions over a given time period.

## **Tests and Results:**

A total of 13 tables were generated and 15 Visualisation plots were generated to interpret the data and visualise them. In this report a sample of them are presented rest of them are kept in their respective folders and their respective codes are explained in the comments.

## **Sample tables generated:**

- Aggregated data frame after removing columns that are not required.

Archive.Date	Group	Hospital	Specialty	Adult.Child	Age.Categorisation	Time.Bands	Count	Month	Year
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Other	Child	0-15	0-3 Months	4	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Other	Child	0-15	3-6 Months	1	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Other	Child	0-15	6-9 Months	1	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Other	Child	16-64	0-3 Months	1	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Cardiology	Child	0-15	0-3 Months	193	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Cardiology	Child	0-15	3-6 Months	132	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Cardiology	Child	0-15	6-9 Months	85	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Cardiology	Child	0-15	9-12 Months	97	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Cardiology	Child	0-15	12-15 Months	82	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Cardiology	Child	0-15	15-18 Months	55	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Cardiology	Child	0-15	18+ Months	238	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Cardiology	Child	16-64	0-3 Months	4	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Cardiology	Child	16-64	3-6 Months	4	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Cardiology	Child	16-64	6-9 Months	5	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Cardiology	Child	16-64	9-12 Months	5	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Cardiology	Child	16-64	12-15 Months	5	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Cardiology	Child	16-64	15-18 Months	3	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Cardiology	Child	16-64	18+ Months	12	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Dermatology	Child	0-15	0-3 Months	241	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Dermatology	Child	0-15	3-6 Months	267	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Dermatology	Child	0-15	6-9 Months	264	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Dermatology	Child	0-15	9-12 Months	95	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Dermatology	Child	0-15	12-15 Months	3	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Dermatology	Child	0-15	18+ Months	1	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Dermatology	Child	16-64	0-3 Months	4	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Dermatology	Child	16-64	3-6 Months	6	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Dermatology	Child	16-64	6-9 Months	9	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Dermatology	Child	16-64	9-12 Months	2	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Endocrinology	Child	0-15	0-3 Months	67	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Endocrinology	Child	0-15	3-6 Months	10	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Endocrinology	Child	0-15	6-9 Months	4	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Endocrinology	Child	0-15	9-12 Months	5	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Endocrinology	Child	16-64	3-6 Months	1	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Diabetes Mellitus	Child	0-15	0-3 Months	5	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Diabetes Mellitus	Child	0-15	3-6 Months	1	Jan	2014
31/01/2014	Children's Hospital Group	Childrens University Hospital Temple Street	Otolaryngology (ENT)	Child	0-15	0-3 Months	560	Jan	2014

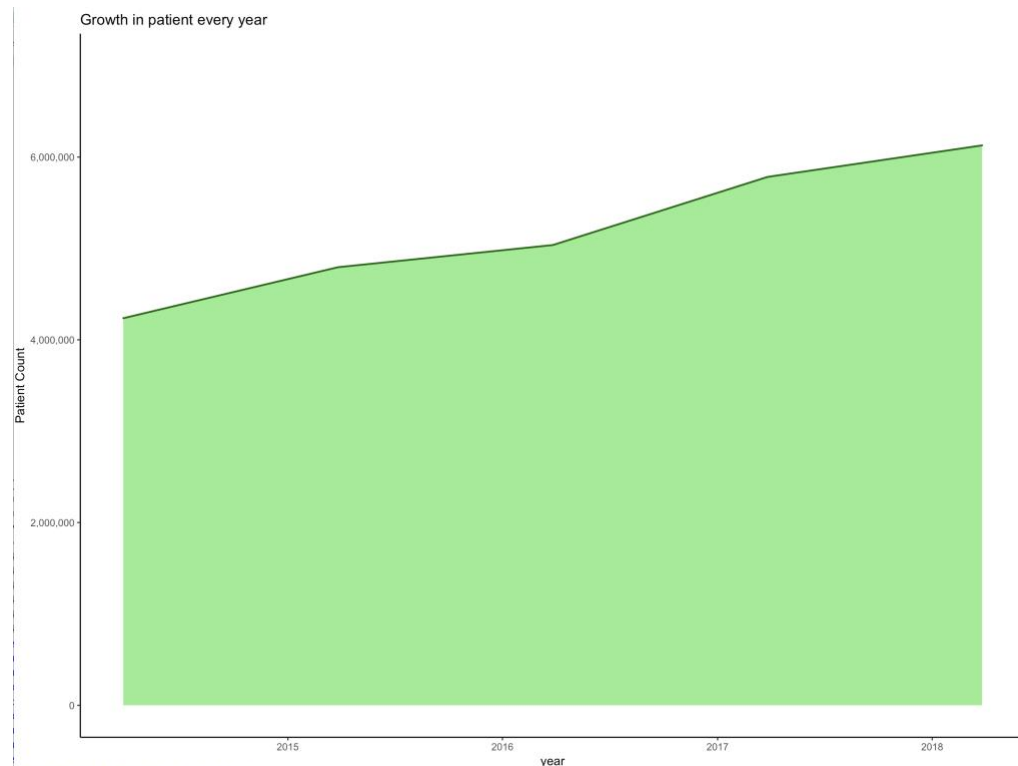
**Fig1 Aggregated.csv**

- Aggregation by hospital name and year

Year	Hospital	TotalPatients
2014	Bantry General Hospital	12176
2014	Beaumont Hospital	255516
2014	Cappagh National Orthopaedic Hospital	19394
2014	Cavan General Hospital	80965
2014	Childrens University Hospital Temple Street	124239
2014	Connolly Hospital	102490
2014	Cork University Hospital	247456
2014	Croom Orthopaedic Hospital	33561
2014	Ennis Hospital	30277
2014	Galway University Hospital	339643
2014	Kerry General Hospital	85771
2014	Letterkenny General Hospital	155517
2014	Louth County Hospital	22018
2014	Mallow General Hospital	26415
2014	Mater Misericordiae University Hospital	238867
2014	Mayo General Hospital	65852
2014	Mercy University Hospital	64870
2014	Midland Regional Hospital Mullingar	78206
2014	Midland Regional Hospital Portlaoise	44176
2014	Midland Regional Hospital Tullamore	125984
2014	Naas General Hospital	61011
2014	Nenagh Hospital	20473
2014	Our Lady of Lourdes Hospital Drogheda	113084
2014	Our Lady's Children's Hospital Crumlin	149321
2014	Our Lady's Hospital Navan	47275
2014	Portiuncula Hospital	37845
2014	Roscommon Hospital	24053
2014	Royal Victoria Eye and Ear Hospital	98347
2014	Sligo Regional Hospital	128451
2014	South Infirmary Victoria University Hospital	200882
2014	South Tipperary General Hospital	26445
2014	St. Columcille's Hospital	25854
2014	St. James's Hospital	130044
2014	St. John's Hospital Limerick	14015
2014	St. Luke's General Hospital Kilkenny	30442

**Fig 2 ByYearHospital.csv**

## Sample plots generated:



**Fig 3 Growth in patient count every year**



**Fig 4 Visualisation by year and hospital name**

## **Observations and conclusions:**

- In general, total number of patients has seen an increasing trend between 2014 and 2018.
- Nenagh hospital, university hospital Waterford, university hospital limerick, St James hospital, St vincent's university hospital have seen a clean increasing trends of patient count
- South west hospital group and Ireland east hospital group provide treatment to most of the total patients recorded.
- Neurosurgery, otolaryngology (ENT), Paed cardiology, orthopedics has a significant contribution and increase towards number of patients ever since 2016.
- Number of adult patients has seen a significant increase between 2014 to 2018
- Among the total number of patients, the greatest number of patients are of the age group 16-64
- Patients under the waiting time band of 18+ months have significantly increased ever since 2017
- The number of patients see an increase every year between January and October and stabilise after the month of October.