Assigmnment3

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# Introduction

Download the le ProgAssignment3-data.zip le containing the data for Programming Assignment 3 from the Coursera web site. Unzip the le in a directory that will serve as your working directory. When you start up R make sure to change your working directory to the directory where you unzipped the data. The data for this assignment come from the Hospital Compare web site (<http://hospitalcompare.hhs.gov>) run by the U.S. Department of Health and Human Services. The purpose of the web site is to provide data and information about the quality of care at over 4,000 Medicare-certied hospitals in the U.S. This dataset es- sentially covers all major U.S. hospitals. This dataset is used for a variety of purposes, including determining whether hospitals should be ned for not providing high quality care to patients (see <http://goo.gl/jAXFX> for some background on this particular topic). The Hospital Compare web site contains a lot of data and we will only look at a small subset for this assignment. The zip le for this assignment contains three les • outcome-of-care-measures.csv: Contains information about 30-day mortality and readmission rates for heart attacks, heart failure, and pneumonia for over 4,000 hospitals. • hospital-data.csv: Contains information about each hospital. • Hospital\_Revised\_Flatfiles.pdf: Descriptions of the variables in each le (i.e the code book). A description of the variables in each of the les is in the included PDF le named Hospital\_Revised\_Flatfiles.pdf. This document contains information about many other les that are not included with this programming assignment. You will want to focus on the variables for Number 19 (of Care Measures.csv“) and Number 11 (Data.csv”). You may nd it useful to print out this document (at least the pages for Tables 19 and 11) to have next to you while you work on this assignment. In particular, the numbers of the variables for each table indicate column indices in each table (i.e. Name" is column 2 in the outcome-of-care-measures.csv le).

# Read data

### Read the outcome data into R via the read.csv function and look at the frst few rows.

outcome <- read.csv("outcome-of-care-measures.csv", colClasses = "character")  
head(outcome)

## Provider.Number Hospital.Name Address.1  
## 1 010001 SOUTHEAST ALABAMA MEDICAL CENTER 1108 ROSS CLARK CIRCLE  
## 2 010005 MARSHALL MEDICAL CENTER SOUTH 2505 U S HIGHWAY 431 NORTH  
## 3 010006 ELIZA COFFEE MEMORIAL HOSPITAL 205 MARENGO STREET  
## 4 010007 MIZELL MEMORIAL HOSPITAL 702 N MAIN ST  
## 5 010008 CRENSHAW COMMUNITY HOSPITAL 101 HOSPITAL CIRCLE  
## 6 010010 MARSHALL MEDICAL CENTER NORTH 8000 ALABAMA HIGHWAY 69  
## Address.2 Address.3 City State ZIP.Code County.Name Phone.Number  
## 1 DOTHAN AL 36301 HOUSTON 3347938701  
## 2 BOAZ AL 35957 MARSHALL 2565938310  
## 3 FLORENCE AL 35631 LAUDERDALE 2567688400  
## 4 OPP AL 36467 COVINGTON 3344933541  
## 5 LUVERNE AL 36049 CRENSHAW 3343353374  
## 6 GUNTERSVILLE AL 35976 MARSHALL 2565718000  
## Hospital.30.Day.Death..Mortality..Rates.from.Heart.Attack  
## 1 14.3  
## 2 18.5  
## 3 18.1  
## 4 Not Available  
## 5 Not Available  
## 6 Not Available  
## Comparison.to.U.S..Rate...Hospital.30.Day.Death..Mortality..Rates.from.Heart.Attack  
## 1 No Different than U.S. National Rate  
## 2 No Different than U.S. National Rate  
## 3 No Different than U.S. National Rate  
## 4 Number of Cases Too Small  
## 5 Number of Cases Too Small  
## 6 Number of Cases Too Small  
## Lower.Mortality.Estimate...Hospital.30.Day.Death..Mortality..Rates.from.Heart.Attack  
## 1 12.1  
## 2 14.7  
## 3 14.8  
## 4 Not Available  
## 5 Not Available  
## 6 Not Available  
## Upper.Mortality.Estimate...Hospital.30.Day.Death..Mortality..Rates.from.Heart.Attack  
## 1 17.0  
## 2 23.0  
## 3 21.8  
## 4 Not Available  
## 5 Not Available  
## 6 Not Available  
## Number.of.Patients...Hospital.30.Day.Death..Mortality..Rates.from.Heart.Attack  
## 1 666  
## 2 44  
## 3 329  
## 4 14  
## 5 9  
## 6 22  
## Footnote...Hospital.30.Day.Death..Mortality..Rates.from.Heart.Attack  
## 1   
## 2   
## 3   
## 4 number of cases is too small (fewer than 25) to reliably tell how well the hospital is performing  
## 5 number of cases is too small (fewer than 25) to reliably tell how well the hospital is performing  
## 6 number of cases is too small (fewer than 25) to reliably tell how well the hospital is performing  
## Hospital.30.Day.Death..Mortality..Rates.from.Heart.Failure  
## 1 11.4  
## 2 15.2  
## 3 11.3  
## 4 13.6  
## 5 13.8  
## 6 12.5  
## Comparison.to.U.S..Rate...Hospital.30.Day.Death..Mortality..Rates.from.Heart.Failure  
## 1 No Different than U.S. National Rate  
## 2 Worse than U.S. National Rate  
## 3 No Different than U.S. National Rate  
## 4 No Different than U.S. National Rate  
## 5 No Different than U.S. National Rate  
## 6 No Different than U.S. National Rate  
## Lower.Mortality.Estimate...Hospital.30.Day.Death..Mortality..Rates.from.Heart.Failure  
## 1 9.5  
## 2 12.2  
## 3 9.1  
## 4 10.0  
## 5 9.9  
## 6 9.9  
## Upper.Mortality.Estimate...Hospital.30.Day.Death..Mortality..Rates.from.Heart.Failure  
## 1 13.7  
## 2 18.8  
## 3 13.9  
## 4 18.2  
## 5 18.7  
## 6 15.6  
## Number.of.Patients...Hospital.30.Day.Death..Mortality..Rates.from.Heart.Failure  
## 1 741  
## 2 234  
## 3 523  
## 4 113  
## 5 53  
## 6 163  
## Footnote...Hospital.30.Day.Death..Mortality..Rates.from.Heart.Failure  
## 1   
## 2   
## 3   
## 4   
## 5   
## 6   
## Hospital.30.Day.Death..Mortality..Rates.from.Pneumonia  
## 1 10.9  
## 2 13.9  
## 3 13.4  
## 4 14.9  
## 5 15.8  
## 6 8.7  
## Comparison.to.U.S..Rate...Hospital.30.Day.Death..Mortality..Rates.from.Pneumonia  
## 1 No Different than U.S. National Rate  
## 2 No Different than U.S. National Rate  
## 3 No Different than U.S. National Rate  
## 4 No Different than U.S. National Rate  
## 5 No Different than U.S. National Rate  
## 6 Better than U.S. National Rate  
## Lower.Mortality.Estimate...Hospital.30.Day.Death..Mortality..Rates.from.Pneumonia  
## 1 8.6  
## 2 11.3  
## 3 11.2  
## 4 11.6  
## 5 11.4  
## 6 6.8  
## Upper.Mortality.Estimate...Hospital.30.Day.Death..Mortality..Rates.from.Pneumonia  
## 1 13.7  
## 2 17.0  
## 3 15.8  
## 4 19.0  
## 5 21.5  
## 6 11.0  
## Number.of.Patients...Hospital.30.Day.Death..Mortality..Rates.from.Pneumonia  
## 1 371  
## 2 372  
## 3 836  
## 4 239  
## 5 61  
## 6 315  
## Footnote...Hospital.30.Day.Death..Mortality..Rates.from.Pneumonia  
## 1   
## 2   
## 3   
## 4   
## 5   
## 6   
## Hospital.30.Day.Readmission.Rates.from.Heart.Attack  
## 1 19.0  
## 2 Not Available  
## 3 17.8  
## 4 Not Available  
## 5 Not Available  
## 6 Not Available  
## Comparison.to.U.S..Rate...Hospital.30.Day.Readmission.Rates.from.Heart.Attack  
## 1 No Different than U.S. National Rate  
## 2 Number of Cases Too Small  
## 3 No Different than U.S. National Rate  
## 4 Number of Cases Too Small  
## 5 Number of Cases Too Small  
## 6 Number of Cases Too Small  
## Lower.Readmission.Estimate...Hospital.30.Day.Readmission.Rates.from.Heart.Attack  
## 1 16.6  
## 2 Not Available  
## 3 14.9  
## 4 Not Available  
## 5 Not Available  
## 6 Not Available  
## Upper.Readmission.Estimate...Hospital.30.Day.Readmission.Rates.from.Heart.Attack  
## 1 21.7  
## 2 Not Available  
## 3 21.5  
## 4 Not Available  
## 5 Not Available  
## 6 Not Available  
## Number.of.Patients...Hospital.30.Day.Readmission.Rates.from.Heart.Attack  
## 1 728  
## 2 21  
## 3 342  
## 4 1  
## 5 4  
## 6 13  
## Footnote...Hospital.30.Day.Readmission.Rates.from.Heart.Attack  
## 1   
## 2 number of cases is too small (fewer than 25) to reliably tell how well the hospital is performing  
## 3   
## 4 number of cases is too small (fewer than 25) to reliably tell how well the hospital is performing  
## 5 number of cases is too small (fewer than 25) to reliably tell how well the hospital is performing  
## 6 number of cases is too small (fewer than 25) to reliably tell how well the hospital is performing  
## Hospital.30.Day.Readmission.Rates.from.Heart.Failure  
## 1 23.7  
## 2 22.5  
## 3 19.8  
## 4 27.1  
## 5 24.7  
## 6 23.9  
## Comparison.to.U.S..Rate...Hospital.30.Day.Readmission.Rates.from.Heart.Failure  
## 1 No Different than U.S. National Rate  
## 2 No Different than U.S. National Rate  
## 3 Better than U.S. National Rate  
## 4 No Different than U.S. National Rate  
## 5 No Different than U.S. National Rate  
## 6 No Different than U.S. National Rate  
## Lower.Readmission.Estimate...Hospital.30.Day.Readmission.Rates.from.Heart.Failure  
## 1 21.3  
## 2 19.2  
## 3 17.2  
## 4 22.4  
## 5 19.9  
## 6 20.1  
## Upper.Readmission.Estimate...Hospital.30.Day.Readmission.Rates.from.Heart.Failure  
## 1 26.5  
## 2 26.1  
## 3 22.9  
## 4 31.9  
## 5 30.2  
## 6 28.2  
## Number.of.Patients...Hospital.30.Day.Readmission.Rates.from.Heart.Failure  
## 1 891  
## 2 264  
## 3 614  
## 4 135  
## 5 59  
## 6 173  
## Footnote...Hospital.30.Day.Readmission.Rates.from.Heart.Failure  
## 1   
## 2   
## 3   
## 4   
## 5   
## 6   
## Hospital.30.Day.Readmission.Rates.from.Pneumonia  
## 1 17.1  
## 2 17.6  
## 3 16.9  
## 4 19.4  
## 5 18.0  
## 6 18.7  
## Comparison.to.U.S..Rate...Hospital.30.Day.Readmission.Rates.from.Pneumonia  
## 1 No Different than U.S. National Rate  
## 2 No Different than U.S. National Rate  
## 3 No Different than U.S. National Rate  
## 4 No Different than U.S. National Rate  
## 5 No Different than U.S. National Rate  
## 6 No Different than U.S. National Rate  
## Lower.Readmission.Estimate...Hospital.30.Day.Readmission.Rates.from.Pneumonia  
## 1 14.4  
## 2 15.0  
## 3 14.7  
## 4 15.9  
## 5 14.0  
## 6 15.7  
## Upper.Readmission.Estimate...Hospital.30.Day.Readmission.Rates.from.Pneumonia  
## 1 20.4  
## 2 20.6  
## 3 19.5  
## 4 23.2  
## 5 22.8  
## 6 22.2  
## Number.of.Patients...Hospital.30.Day.Readmission.Rates.from.Pneumonia  
## 1 400  
## 2 374  
## 3 842  
## 4 254  
## 5 56  
## 6 326  
## Footnote...Hospital.30.Day.Readmission.Rates.from.Pneumonia  
## 1   
## 2   
## 3   
## 4   
## 5   
## 6

## —- To make a simple histogram of the 30-day death rates from heart attack (column 11 in the outcome dataset),run

outcome[,11] <- as.numeric(outcome[,11])

## Warning: NAs introducidos por coerción

hist(outcome[,11])

