A1.Financiacion del Gasto Sanitario

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Contents

1.PROCESAMIENTO DE LOS DATOS.

- En primer lugar leemos el fichero:

```r
gasto_f<-read.csv("C:/temp/GastoSanitario_Financiacion.csv",sep= ",")
```

- Realicemos una breve inspección de los datos

```r
str(gasto_f)
```

```
## 'data.frame':    2000 obs. of  6 variables:
##  $ TIME              : int  2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 ...
##  $ GEO               : Factor w/ 40 levels "Austria","Belgium",..: 15 15 15 15 15 16 16 16 16 16 ...
##  $ UNIT              : Factor w/ 1 level "Million euro": 1 1 1 1 1 1 1 1 1 1 ...
##  $ ICHA11_HF         : Factor w/ 5 levels "All financing schemes",..: 1 4 3 2 5 1 4 3 2 5 ...
##  $ Value             : Factor w/ 1185 levels ":","0.00","1 001 514.67",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ Flag.and.Footnotes: Factor w/ 2 levels "","b": 1 1 1 1 1 1 1 1 1 1 ...
```

```r
colnames(gasto_f) #Nombre de las variables
```

```
## [1] "TIME"               "GEO"                "UNIT"
## [4] "ICHA11_HF"          "Value"              "Flag.and.Footnotes"
```

```r
nrow(gasto_f) #Número de registros
```

```
## [1] 2000
```

```r
ncol(gasto_f) #Número de variables
```

```
## [1] 6
```

*Observamos las siguientes variables:

- **TIME**: variable cuantitativa. Indica el año en el que se ha realizado la medida, en este caso el valor de la variable "Value". Se ha cargado bien como número entero.
- **GEO**: variable cualitativa. Indica el país o región en el que se ha realizado la medida.Se ha cargado bien como factor.
- **UNIT**: variable cualitativa. Indica la medida de la variable valor.Se ha cargado bien como factor.
- **ICHA11_HF**: variable cualitativa. Indica el organismo que financia la sanidad, ya sea gubernamental o por seguros privados etc..
- **Value**: Variable cuantitativa. Indica el valor en Millones de Euros de esta financiación.Se ha cargado mal como factor. Haremos la transformación a valor numérico.
- **Fal.and.footnotes**. Notas sobre etiquetas. Eliminamos esta columna.

*Años de las mediciones:

```r
unique(gasto_f$TIME)
```

```
##  [1] 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
```

*Paises:

```r
unique(gasto_f$GEO)
```

```
##  [1] European Union - 27 countries (from 2020)
##  [2] European Union - 28 countries (2013-2020)
##  [3] European Union - 27 countries (2007-2013)
##  [4] European Union - 15 countries (1995-2004)
##  [5] Euro area - 19 countries  (from 2015)
##  [6] Euro area - 18 countries (2014)
##  [7] Euro area - 12 countries (2001-2006)
##  [8] Belgium
##  [9] Bulgaria
## [10] Czechia
## [11] Denmark
## [12] Germany (until 1990 former territory of the FRG)
## [13] Estonia
## [14] Ireland
## [15] Greece
## [16] Spain
## [17] France
## [18] Croatia
## [19] Italy
## [20] Cyprus
## [21] Latvia
## [22] Lithuania
## [23] Luxembourg
## [24] Hungary
## [25] Malta
## [26] Netherlands
## [27] Austria
## [28] Poland
## [29] Portugal
## [30] Romania
## [31] Slovenia
## [32] Slovakia
## [33] Finland
## [34] Sweden
## [35] Iceland
## [36] Liechtenstein
## [37] Norway
## [38] Switzerland
## [39] United Kingdom
## [40] Bosnia and Herzegovina
## 40 Levels: Austria Belgium Bosnia and Herzegovina Bulgaria Croatia ... United Kingdom
```

*Unidad de las mediciones:

```r
unique(gasto_f$UNIT)
```

```
## [1] Million euro
## Levels: Million euro
```

*Variable que indica cómo se financia el gasto sanitario

```r
unique(gasto_f$ICHA11_HF)
```

```
## [1] All financing schemes
## [2] Government schemes and compulsory contributory health care financing schemes
## [3] Government schemes
## [4] Compulsory contributory health insurance schemes and compulsory medical saving accounts (CMSA)
## [5] Social health insurance schemes
## 5 Levels: All financing schemes ...
```

- Eliminamos la columna Fal.and.footnotes.

```
gasto_f<-gasto_f[,-6]
```

- Tendríamos que convertir la columna Value a numérico porque se ha cargado como factor y es erróneo. El resto de variables tienen el tipo correcto.

```
gasto_f$Value<-as.character(gasto_f$Value)
gasto_f$Value<-(gsub(',','.',gasto_f$Value) )
gasto_f$Value<-(gsub(' ','',gasto_f$Value) )
gasto_f$Value<-as.numeric(gasto_f$Value)
```

```
## Warning: NAs introducidos por coerción
```

- Comprobamos que valores tenemos en la columna **Value**:

```
table(gasto_f$Value, useNA = "ifany")
```

```
## 
##          0        3.3       3.61       3.97       4.14       7.62       8.18 
##         89          2          2          2          2          2          2 
##       8.66       8.98        9.2      27.15      29.05      29.57      31.85 
##          2          2          2          1          1          1          1 
##      35.55      38.21      41.06      43.46      48.56      49.34       49.4 
##          1          1          1          1          1          1          1 
##      52.64      53.72      56.22       60.1      63.88      76.89      77.39 
##          1          1          1          4          4          1          1 
##      77.55      86.03      86.96      94.17      98.47      98.54     101.75 
##          2          1          1          1          1          1          1 
##     106.77     112.06     113.21      118.9     118.98     119.65     124.32 
##          1          1          1          1          1          1          1 
##     124.85     126.05     128.66     134.51      136.3     136.51     137.89 
##          1          1          1          1          1          2          1 
##     138.32     138.35      140.9     141.72     142.39      144.7     145.98 
##          1          1          2          1          1          2          1 
##     146.56     150.44     151.76     156.33     157.83     164.87     164.88 
##          2          1          1          2          1          2          2 
##     175.06     177.33     179.69     179.86     181.71     181.89     182.71 
##          2          1          2          1          2          2          2 
##     184.36     185.77     188.98      192.7     196.68     197.75     198.88 
##          1          1          1          1          1          1          2 
##     199.31     200.27     205.73     210.27     213.43     213.47     214.22 
##          2          1          1          1          1          1          1 
##     221.22        227     228.79     234.86     241.57     245.24      245.3 
##          1          2          1          1          1          1          1 
##     251.37        260        267     276.68     283.02        310      320.5 
##          1          2          2          1          1          1          1 
##     322.95      324.9     325.71        326     329.92        341        343 
##          1          1          1          2          1          2          2 
##     344.32     350.12        351     371.58      372.6     376.89     389.38 
##          1          1          2          1          1          1          1 
##     413.42     428.65     436.61     456.59     462.82     487.53     509.65
##          2          1          2          1          2          2          1
##     513.62        514     521.62     525.79     529.93     538.74     554.77
##          1          1          1          1          1          2          1
##     558.38     567.86     575.04     576.04     581.57      583.7     590.54
##          1          1          1          1          1          1          1
##     595.69     601.79     606.83     608.41      609.7     610.98     611.91
##          2          1          1          1          2          1          1
##     614.77     615.21     622.18     626.87      637.5     642.03     648.02
##          1          1          2          1          2          1          1
##     655.41      655.5     687.93     690.49     700.26     704.42     711.45
##          1          2          2          1          1          2          1
##     719.29     720.72     723.15     735.91      739.8     744.27     750.62
##          2          1          1          2          2          1          2
##     767.47     770.23     795.04     795.88     801.14     802.61      814.6
##          1          2          1          2          1          2          2
##     854.93     860.23     869.34     883.13     883.87     889.47     892.41
##          2          1          2          1          1          1          2
##     898.48     907.03     910.28     916.43     922.85     925.55     928.65
##          1          2          1          2          2          1          1
##      932.1     936.07     937.77     939.05     945.12        965     967.34
##          1          1          2          1          1          1          1
##     970.09     970.49     974.37     977.46     991.84     997.32     999.83
##          2          1          2          2          1          1          1
##    1001.94    1009.92    1029.39    1030.46    1042.18    1045.15    1066.86
##          1          1          2          2          1          1          1
##     1067.6    1069.83    1080.38     1108.6     1109.7    1114.21    1120.09
##          1          1          2          1          1          1          2
##    1137.77    1144.45    1157.32    1172.24     1211.8    1218.96    1222.15
##          1          2          1          2          1          1          2
##    1227.09    1232.72    1233.07    1234.64    1240.98    1245.77    1249.79
##          1          1          1          1          2          1          1
##    1265.08     1274.3     1274.8    1274.97    1277.15    1277.92    1289.16
##          1          1          2          1          1          1          1
##    1289.82    1290.77    1301.85     1318.9    1322.65    1350.33    1364.93
##          1          1          2          1          1          1          1
##    1369.99    1385.82    1388.84    1395.78    1402.12    1410.14    1410.81
##          1          2          1          2          1          1          1
##    1411.66    1422.06    1430.98    1432.71    1435.62    1442.45     1466.1
##          1          1          1          1          1          1          1
##    1473.82    1482.48    1497.88    1519.25    1522.48    1530.64    1533.93
##          2          2          1          1          1          1          2
##    1553.93    1556.09    1556.12     1562.1    1572.66    1577.52    1601.04
##          1          1          2          2          1          1          1
##    1609.73    1610.16    1624.92    1627.39    1640.59    1705.78    1719.06
##          1          2          1          1          2          1          1
##    1734.68    1741.87     1783.4    1791.42    1804.22     1807.4    1810.89
##          1          2          1          2          1          1          1
##    1812.48    1823.31    1862.21    1900.45    1910.39    1933.11    1946.51
##          1          1          1          1          1          1          2
##    1981.24    1993.24    2005.74    2013.19    2016.55    2027.91    2031.79
##          1          1          2          1          1          1          1
##    2035.15    2037.29    2040.68    2059.27    2067.02    2096.85    2108.73
##          1          2          1          1          1          1          1
##    2135.76    2141.64    2146.52    2156.42    2176.64    2180.81    2193.88
##          1          2          1          1          2          1          1
##    2248.59    2261.29    2264.16    2265.58     2275.4    2301.49     2325.2
##          2          1          1          1          1          1          2
##     2345.7    2357.39    2366.09    2376.22     2383.1    2391.75    2392.59
##          2          1          2          1          1          1          1
##    2393.37    2393.85    2411.23    2414.97    2422.71    2423.09    2423.88
##          1          1          1          2          1          1          1
##    2434.39    2436.89     2441.9    2463.12    2484.32    2493.69    2500.96
##          1          1          1          1          1          1          1
##    2501.92     2507.8    2509.49    2522.09    2525.65     2530.5    2541.61
##          1          1          1          1          2          2          1
##    2550.34    2570.38    2581.36    2589.85    2591.25    2594.07    2605.64
##          2          1          1          1          1          1          1
##    2614.83    2627.23    2636.51    2638.25    2645.54    2653.21    2668.86
##          1          1          2          1          1          1          1
##    2708.83     2708.9     2718.2    2718.84    2732.83    2746.86    2751.04
##          1          1          1          1          1          1          1
##    2765.18    2773.81    2782.35    2822.24    2823.48    2841.33    2850.33
##          1          2          1          1          1          1          1
##    2855.23    2873.21    2881.78    2907.78    2919.79    2942.76    2946.38
##          1          1          1          1          1          1          1
##    2949.72    2972.85    2987.17    3003.51    3027.78    3140.15    3174.33
##          1          1          1          1          1          1          1
##     3174.8    3183.72    3185.79    3199.66    3305.61     3309.2    3327.75
##          1          1          1          1          1          1          1
##    3336.93    3346.62    3377.11    3386.12    3428.78    3479.41    3482.18
##          1          1          1          1          1          1          1
##    3520.39    3524.46    3564.52    3628.56    3636.79    3771.58    3797.15
##          1          1          1          1          1          1          1
##    3810.66    3877.79    3898.81       3916    3918.23    3973.88    3984.96
##          1          2          1          1          1          1          1
##    4000.41    4005.45    4006.74     4007.6    4021.09     4025.7    4054.49
##          2          1          1          2          2          2          1
##    4056.67    4059.44     4063.9    4084.35    4087.63    4095.14    4118.22
##          2          2          2          1          1          2          2
##    4120.53    4143.16    4202.25    4205.27    4210.48    4217.01    4220.48
##          1          1          1          2          1          1          2
##    4226.44    4270.12    4274.21    4286.85    4293.38    4301.18    4319.22
##          2          2          2          2          2          2          1
##    4365.28    4380.22    4387.61    4401.84    4435.09    4437.46    4439.52
##          1          2          2          2          2          1          1
##    4456.56    4469.24    4518.96    4520.46     4553.6    4573.41       4599
##          2          2          1          2          1          1          1
##       4602    4634.02    4638.58    4663.25    4665.09    4669.12    4693.37
##          1          2          1          2          1          1          2
##    4801.14    4832.14    4841.77    4868.47    4929.62       4952    4959.25
##          1          1          2          1          1          1          2
##     4978.7    4987.04    5024.34     5082.1    5084.01    5111.83     5198.4
##          2          1          1          1          1          2          2
##    5256.33    5271.48    5418.25    5457.82    5532.26    5550.07    5550.77
##          1          1          1          2          1          1          2
##    5583.37    5666.47    5721.14    5898.66    5924.24    5978.53    5991.41
##          1          1          1          1          1          1          1
##    6031.13    6109.23     6115.4    6181.66    6199.11    6225.29    6281.85
##          2          2          1          1          1          1          1
##    6475.43    6664.98    6832.62    7242.98    7396.44    7428.99    7431.57
##          1          1          1          2          1          1          1
##    7467.03    7488.05    7568.11    7607.11     7642.3    7730.72    7765.34
##          1          1          1          1          1          1          1
##    7922.96    8078.13    8088.27    8123.68    8182.77    8345.08    8372.56
##          1          2          1          1          1          2          1
##    8509.07    8511.46    8531.31    8584.89    8678.33    8718.68    8783.25
##          1          1          1          2          1          2          2
##    8805.81    8871.69     8963.5    9037.78    9066.29    9150.43     9272.6
##          1          1          1          1          1          2          1
##    9383.74    9552.83    9569.07    9601.01    9667.08    9671.85    9913.58
##          1          1          2          1          1          1          1
##    10002.3   10050.99    10118.2   10120.37   10139.39      10144   10175.67
##          1          1          1          1          1          1          1
##    10296.2    10317.1   10319.25    10322.1   10337.18   10357.38   10386.72
##          1          1          1          1          1          1          1
##   10433.25   10474.73   10664.53   10674.04    10712.4   10734.83   10800.13
##          1          1          1          1          1          1          1
##   10826.73   11026.33   11070.04   11074.61   11113.22   11171.44   11186.71
##          1          1          2          1          1          1          1
##   11242.85    11366.4   11371.07   11381.55   11411.31   11417.41   11464.33
##          1          1          1          1          1          1          1
##      11788   11831.11   11880.22   11937.08   11989.32   12031.83   12118.96
##          1          1          1          1          1          1          1
##   12151.77   12202.11      12245   12257.05   12280.38   12314.41   12326.83
##          1          1          1          1          1          1          1
##   12609.76   12667.45   12737.35   12739.82   12793.29   12887.44   12906.95
##          1          1          1          1          1          1          1
##   12914.87   12941.89   13082.72   13113.14   13119.25   13173.25   13177.04
##          1          1          2          1          1          1          1
##   13178.77   13192.27   13202.35   13233.25    13258.6   13269.08   13299.88
##          1          2          1          1          1          1          1
##    13322.8   13386.68   13435.74   13488.38   13510.27   13599.53    13794.5
##          1          1          1          1          1          2          1
##   13842.22   13854.61   13864.05   14024.42      14093   14152.22   14173.16
##          1          1          1          1          1          2          1
##    14210.2   14251.47   14274.96   14338.62   14354.74   14498.42   14512.34
##          1          1          1          1          1          1          2
##    14528.4   14592.28      14666   14820.52   15028.19   15067.24   15130.67
##          1          1          1          1          1          1          2
##   15177.92   15265.83   15272.32   15396.21   15473.76    15476.7      15504
##          1          1          1          1          1          1          1
##   15549.23   15615.76   15616.77   15631.26   15652.06   15652.76   15687.07
##          1          1          1          1          1          1          1
##   15720.72   15742.27   15752.23   15775.13   15783.22   15788.08   15821.35
##          2          1          1          1          1          1          1
##   15871.89   16127.15   16132.19   16242.64   16306.21   16442.88   16453.29
##          1          1          1          1          2          1          1
##   16459.59   16471.87   16570.81    16589.8   16605.15   16650.25   16790.72
##          1          1          1          1          1          1          1
##   16811.38   16957.25   17030.26   17200.09   17332.44   17565.51   17668.16
##          1          2          1          1          1          1          1
##   17692.73   17781.81   17930.41    18071.5   18146.08   18261.42   18281.97
##          2          1          1          1          1          1          1
##   18292.67   18505.51   18533.95      18597   18690.74   18714.64      18793
##          1          1          1          1          1          1          1
##   18850.22   18874.61    19092.9   19137.02   19231.95   19241.54      19271
##          1          1          1          1          1          1          1
##      19296   19303.39   19381.74   19387.49      19629   20034.38    20143.2
##          1          1          1          1          1          1          1
##      20169   20236.91   20388.59   20398.75   20653.82      20999   21043.06
##          1          1          1          1          1          1          2
##   21076.18   21116.97    21246.3   21259.26   21508.34   21895.41    21945.8
##          2          1          1          1          1          2          1
##      21963    22120.5   22171.68   22344.57   22451.65    22521.9   22576.02
##          1          1          2          1          1          1          1
##   22758.57   22769.63      23027   23200.55   23245.02    23474.9   23494.22
##          2          2          1          1          1          1          1
##    23505.6      24141   24160.16   24270.42   24335.99   24354.43   24475.86
##          2          1          2          1          1          1          1
##      24498   24656.34      24756    24770.9   24790.68   24869.14   25126.67
##          1          1          1          1          1          2          1
##   25138.33   25157.65    25166.2   25167.02   25355.51   25541.57   25563.92
##          1          1          1          1          1          2          1
##   25633.61   25650.74   25675.36   25681.21   25695.52    25714.3   26072.23
##          1          1          1          1          1          2          1
##   26260.39   26280.85   26313.05   26433.12   26587.63   26644.27   26663.41
##          1          1          1          1          2          1          1
##   27032.54   27080.39    27099.6   27280.04   27304.88   27380.82   27603.75
##          1          1          1          1          1          1          1
##   27756.39   27920.23   27921.96   27938.71   28272.65   28368.56   28720.24
##          1          1          1          1          1          1          1
##   29139.31   29454.88   29500.21   29597.66   29705.23   29724.56   29868.19
##          1          1          2          1          1          1          2
##   29963.73   29999.15   30118.44    30155.1   30243.65   30312.02   30449.93
##          2          1          2          2          1          1          1
##    30663.8   30880.16   31024.55   31028.69   31062.62   31093.91   31202.33
##          1          1          2          1          1          1          1
##   31493.31   31501.68   31539.12   31544.88   31912.59   32499.92      32923
##          1          1          1          2          1          1          1
##   33316.59   33662.37   33776.92   34540.89   34806.36   35129.57   35132.03
##          1          1          1          1          1          1          1
##   35220.23   35248.35   35318.92   35692.35   35879.39   35947.93   36330.37
##          1          1          1          1          1          1          2
##   36447.73    36514.1   36971.09   37020.51   37162.79    37595.1   38347.31
##          1          1          1          1          1          1          1
##   38865.77   38878.69   39071.17   39790.92   40369.95   40483.73   40574.75
##          1          2          1          1          2          2          1
##   41349.98   41494.19   42073.83   42669.79   43024.65   43449.59   43649.14
##          2          1          1          2          1          1          2
##   43883.92   44235.18   45327.09   45651.91   46133.37   46166.63   46406.61
##          2          1          1          1          1          1          1
##   46511.43   47189.76   47417.47   48043.85      48178   48590.26   49180.41
##          1          1          1          1          1          1          1
##   50545.47   50782.84   51296.32   51638.91   51775.18   51936.88   52119.65
##          1          1          1          1          1          1          1
##  53023.98  53242.65  53535.02  53973.11  54119.77     54333  55016.02
##         1         1         1         1         1         1         1
##   55183.3     56029  56143.31  56506.16  56722.06  57537.63  57972.47
##         1         1         1         1         1         1         1
##     58404  58808.84     58931     60631  61636.29  61808.25  62439.91
##         1         1         1         1         1         1         1
##     63356  64077.57  64910.43  65695.74  65920.29  65926.46   66554.7
##         1         1         1         1         1         1         1
##  67057.21  67646.49  68085.16  68754.01  68816.48  69106.44  69137.96
##         1         1         1         1         1         1         1
##  69655.06  69900.51  70140.76  70902.02  70964.21  71046.79  71236.22
##         1         1         1         1         1         1         1
##  71350.59   71592.3  71640.74  71672.19     72629   72817.9  73106.85
##         1         1         1         1         1         1         1
##  73408.08     74256  76112.77     77202   92518.8  93824.25  94417.66
##         1         1         1         1         1         1         1
##  97384.01  97532.09  97815.78  98350.22  99715.25 103899.87    106877
##         1         1         1         1         1         1         1
##    107218    107932  108109.7    108258    108500    108789    108851
##         1         1         1         1         1         1         1
##    109132    109819    110086    110857    111117    112885    113112
##         1         1         1         1         1         1         1
##    141526    142676    144317    146613    147963    150697    153085
##         1         1         1         1         1         1         1
## 156594.85 160070.34 164087.65 165915.29 167421.58 168094.88 171096.66
##         2         2         2         2         1         2         1
## 172422.51  175330.5 177818.22 179882.89  180297.1 182709.78 182777.15
##         2         1         2         1         2         2         2
## 184100.08 184679.57 187631.11    188255 188458.23 190413.32 190558.04
##         1         1         1         1         2         1         1
## 191383.57 193184.54    194905    198169 200238.35    203380 204044.23
##         2         1         1         1         1         1         1
## 207927.56 207954.98 209392.49    210249  213440.7    213987    217591
##         1         2         1         1         1         1         1
## 217886.46 218751.88    221609 222266.18 224272.75    225308    226896
##         1         1         1         1         1         1         1
##    229043 229998.79 230575.03 232178.14    236213 236311.46    236887
##         1         1         1         1         1         1         1
##    238061 240259.87    241238 242123.42 242300.03    246387    247064
##         1         1         1         1         1         1         1
## 248958.59    249583 252075.88 256954.86    259060 260651.43    261421
##         1         1         1         1         1         1         1
## 261567.48  261667.4    261705 262928.63 263670.89 265763.66 265897.95
##         1         1         1         1         1         1         1
## 266126.74    271546    271970    272309 274757.99    274841 277110.29
##         1         1         1         1         1         1         1
## 277351.86  281357.9 283787.22 284032.46    284568    284731 286743.94
##         1         1         1         1         1         1         1
##    287820 289314.14 289559.44    290266 295447.76    296807    297784
##         1         1         1         1         1         1         1
## 298268.84 298520.21    299647    309020    311962    322481    324402
##         1         1         1         1         1         1         1
##  335183.2    338267  348580.6    352045 357452.87 366108.52    369091
##         1         1         1         1         1         1         1
##  376125.22     383636     460441  478171.07  485457.62  489222.14  499883.52
##          1          1          2          2          2          1          2
##  504199.31  509576.56  517874.31  517960.35  519475.14  521069.28   536892.5
##          1          1          1          1          2          1          2
##  538068.33  538206.79  539571.43  545315.66  547057.53  547568.54  548597.09
##          2          1          1          1          1          1          1
##  548759.56   548818.3  548836.45  550459.87   553096.7  556448.62  556535.58
##          1          1          1          2          1          1          1
##  557667.28   559053.1  564437.47  564583.45  582432.13  590111.93  591585.75
##          1          1          1          1          2          1          1
##  592075.65  594849.46  595264.37  597679.34  605491.07  613275.79  614837.89
##          1          2          1          2          2          1          1
##  625228.75  629007.28  631557.62  633651.91  635393.78  655577.52  658103.17
##          2          1          2          1          1          1          2
##   680552.1  683325.92  767126.93  780126.57  801739.22  810939.66   812470.3
##          1          2          1          1          1          1          1
##  825216.86  834776.57  836403.96  863789.03  873898.14   875617.2     892236
##          1          1          1          1          1          1          1
##  902645.07  904452.47  919005.69  920675.51  931919.75  933912.99  946258.94
##          1          1          1          1          1          1          1
##  986082.66   989009.5 1001514.67 1008697.28 1024266.83 1028595.97 1041576.67
##          1          1          1          1          1          1          1
## 1043842.25 1047644.89 1058398.22 1059450.14 1071957.52  1074381.4 1086019.02
##          1          1          1          1          1          1          1
## 1098027.42  1099371.6 1100315.44 1101782.84 1102896.79 1121902.15 1122002.56
##          1          1          1          1          1          1          1
## 1136718.59 1139451.42 1143698.85 1151711.99 1154213.92 1155302.55 1171170.68
##          1          1          1          1          1          1          1
## 1174143.54 1177765.84 1177858.74 1178324.45 1180393.07 1204229.74 1206976.61
##          1          1          1          1          1          1          1
## 1213033.52 1244988.57  1245981.9 1247908.36 1285398.21 1290781.83  1331242.9
##          1          1          1          1          1          1          1
## 1333671.16 1397068.08 1404949.74  1405544.6 1407857.52 1435453.13 1471573.22
##          1          1          1          1          1          1          1
##    1474601 1479348.83 1483058.05 1486241.77 1519632.22 1522959.97 1570018.48
##          1          1          1          1          1          1          1
## 1573542.93       <NA>
##          1        513
```

- Observamos que tenemos **513 valores perdidos**.Guardamos en la variable **idx** los índices de los registros con valores **NA** de la variable **Value**.

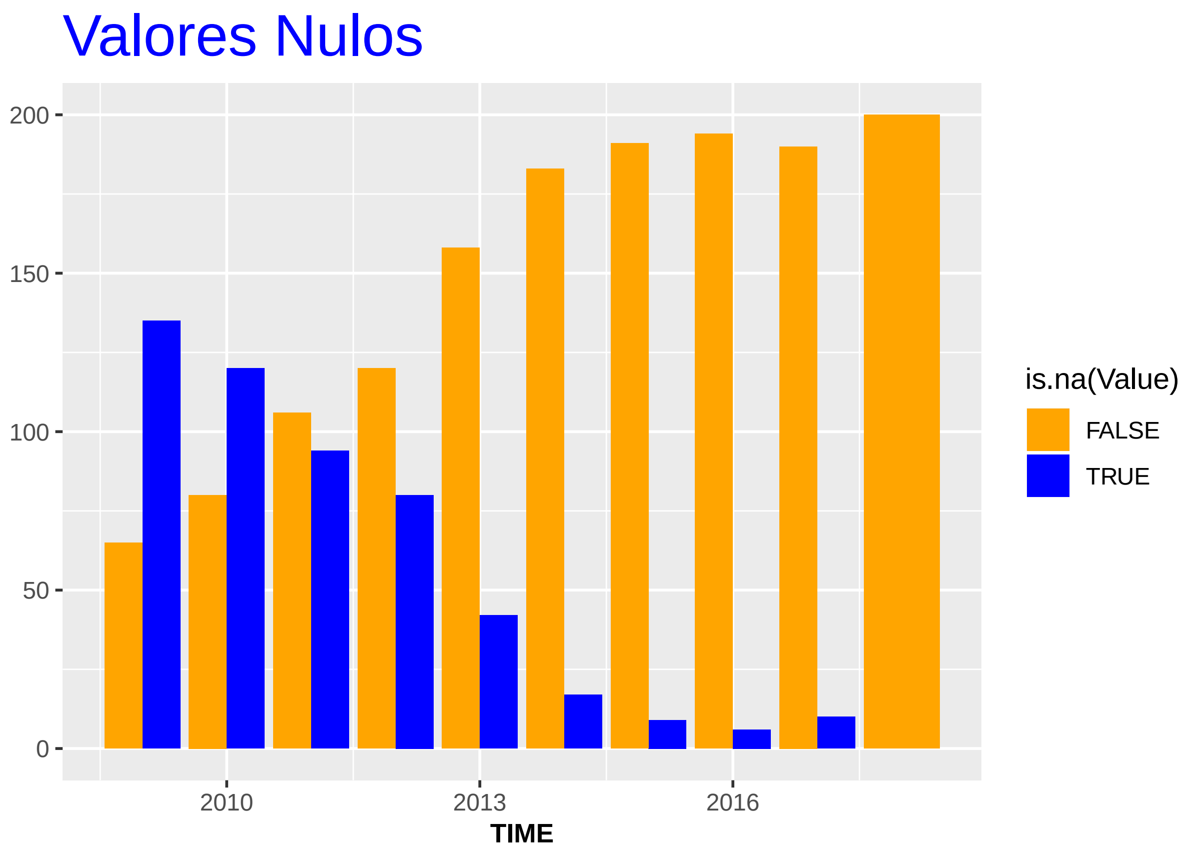
```
idx<-which(is.na(gasto_f$Value))
length(idx)
```

```
## [1] 513
```

- Grafiquemos la información que contiene la variable **Value**

```
library(ggplot2)
library(scales)
g = ggplot(gasto_f, aes(TIME, fill=is.na(Value)) ) +
labs(title = "Valores Nulos")+ylab("") +
theme(plot.title = element_text(size = rel(2), colour = "blue"))

g+geom_bar(position="dodge") + scale_fill_manual(values = alpha(c("orange", "blue"), 1)) +
theme(axis.title.x = element_text(face="bold", size=10))
```



- En caso de detectar algún valor anómalo (en nuestro caso los NAS) en las variables tendríamos que realizar una imputación de esos valores o bien sustituyéndolos por la media o usando el algoritmo KNN (k-Nearest Neighbour) con los 3 vecinos más cercanos usando la distancia que consideremos, en este caso usaremos Gower(Mediana), por ser una medida más robusa frente a extremos.

```
library(VIM)
```

```
## Loading required package: colorspace
```

```
## Loading required package: grid
```

```
## VIM is ready to use.
```

```
## Suggestions and bug-reports can be submitted at: https://github.com/statistikat/VIM/issues
```

```
##
## Attaching package: 'VIM'
```

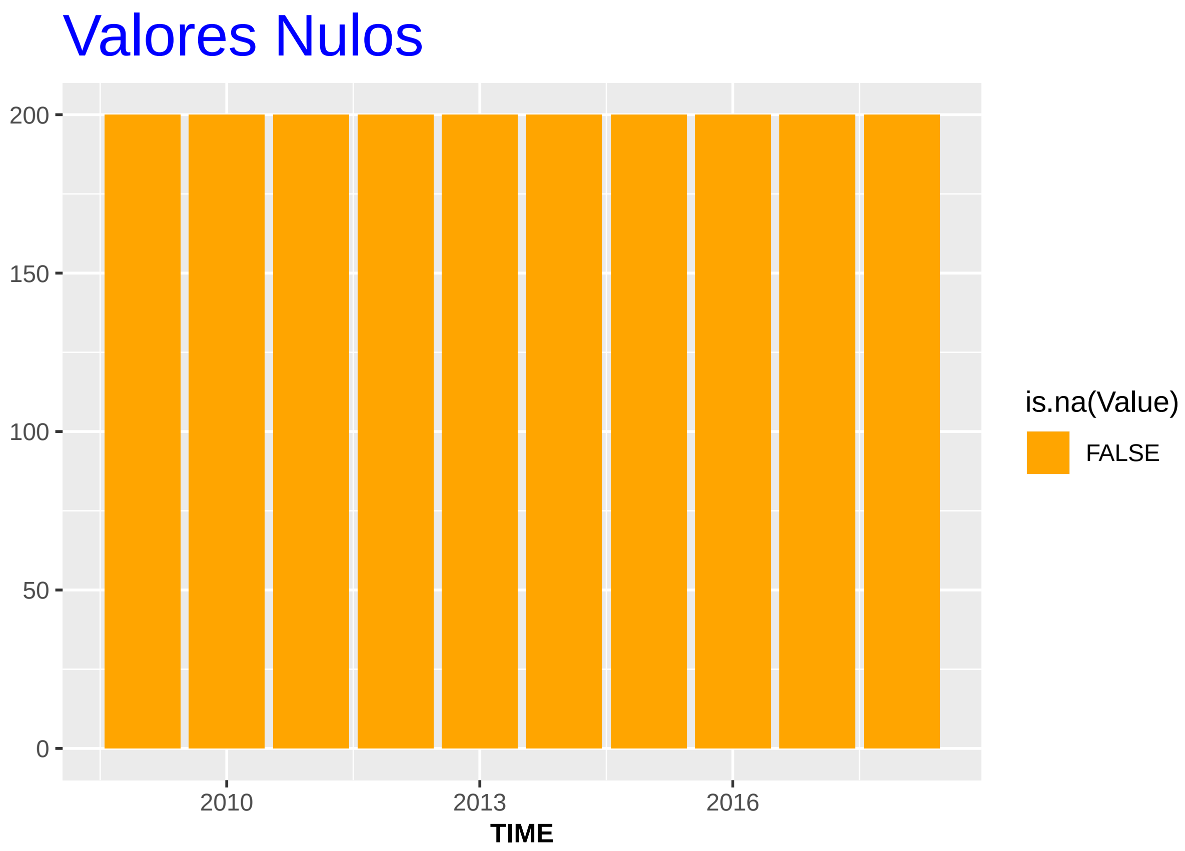
```
## The following object is masked from 'package:datasets':
##
##     sleep
```

```
output<-kNN(gasto_f, variable=c("Value"),k=3)
gasto_f<-output
```

- Comprobamos que no tenemos valores nulos después de la imputación

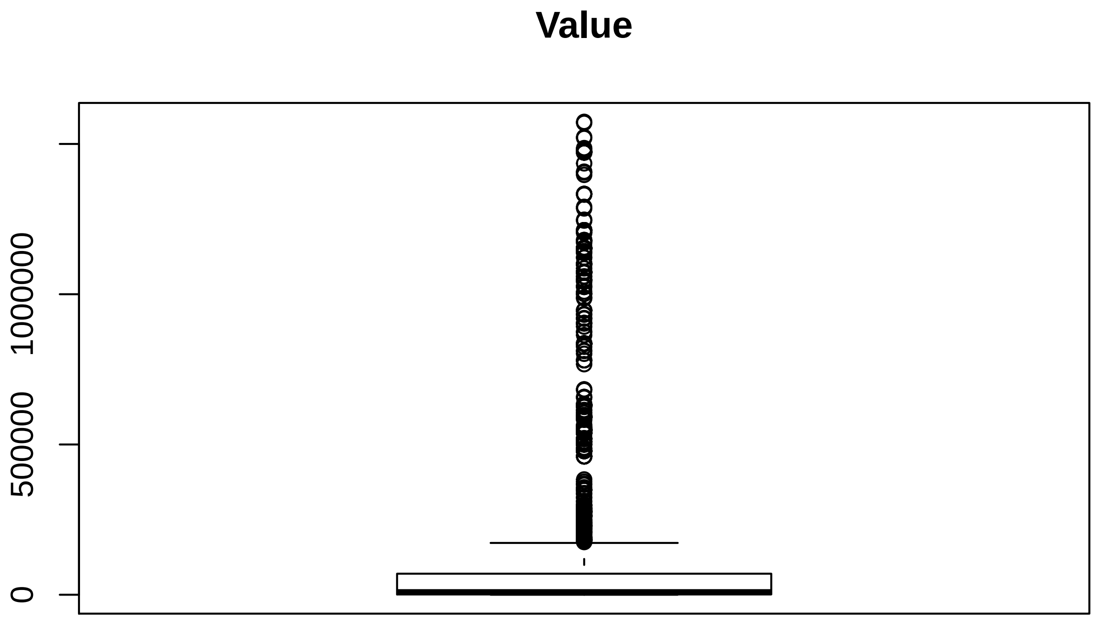
```r
g = ggplot(gasto_f, aes(TIME, fill=is.na(Value)) ) +
labs(title = "Valores Nulos")+ylab("") +
theme(plot.title = element_text(size = rel(2), colour = "blue"))

g+geom_bar(position="dodge") + scale_fill_manual(values = alpha(c("orange", "blue"), 1)) +
theme(axis.title.x = element_text(face="bold", size=10))
```



- Con el siguiente gráfico, observaremos que la variable **Value** tiene outliers o valores extremos

```r
boxplot(gasto_f$Value, main="Value")
```



- Por otro lado, revisamos para el resto de columnas si tenemos valores NA.(desconocidos o perdidos)

```
table(gasto_f$TIME, useNA = "ifany")
```

```
##
## 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
##  200  200  200  200  200  200  200  200  200  200
```

```
table(gasto_f$GEO, useNA = "ifany")
```

```
##
##                                           Austria
##                                                50
##                                           Belgium
##                                                50
##                            Bosnia and Herzegovina
##                                                50
##                                          Bulgaria
##                                                50
##                                           Croatia
##                                                50
##                                            Cyprus
##                                                50
##                                           Czechia
##                                                50
##                                           Denmark
##                                                50
##                                           Estonia
##                                               50
##             Euro area - 12 countries (2001-2006)
##                                               50
##                  Euro area - 18 countries (2014)
##                                               50
##            Euro area - 19 countries  (from 2015)
##                                               50
##        European Union - 15 countries (1995-2004)
##                                               50
##        European Union - 27 countries (2007-2013)
##                                               50
##        European Union - 27 countries (from 2020)
##                                               50
##        European Union - 28 countries (2013-2020)
##                                               50
##                                          Finland
##                                               50
##                                           France
##                                               50
## Germany (until 1990 former territory of the FRG)
##                                               50
##                                           Greece
##                                               50
##                                          Hungary
##                                               50
##                                          Iceland
##                                               50
##                                          Ireland
##                                               50
##                                            Italy
##                                               50
##                                           Latvia
##                                               50
##                                    Liechtenstein
##                                               50
##                                        Lithuania
##                                               50
##                                       Luxembourg
##                                               50
##                                            Malta
##                                               50
##                                      Netherlands
##                                               50
##                                           Norway
##                                               50
##                                           Poland
##                                               50
##                                         Portugal
##                                               50
##                                          Romania
##                                               50
##                                         Slovakia
##                                               50
##                                         Slovenia
##                                               50
##                                            Spain
##                                               50
##                                           Sweden
##                                               50
##                                      Switzerland
##                                               50
##                                   United Kingdom
##                                               50
```

```r
table(gasto_f$UNIT, useNA = "ifany")
```

```
## 
## Million euro 
##         2000
```

```r
table(gasto_f$ICHA11_HF, useNA = "ifany")
```

```
## 
##                                                                           All financing schemes
##                                                                                             400
## Compulsory contributory health insurance schemes and compulsory medical saving accounts (CMSA)
##                                                                                             400
##                                                                              Government schemes
##                                                                                             400
##                   Government schemes and compulsory contributory health care financing schemes
##                                                                                             400
##                                                                 Social health insurance schemes
##                                                                                             400
```

Observamos que no existen ahora valores perdidos después de la imputación.La suma de las cantidades de cada variable, suman el total.

- Finalmente, creamos un fichero con toda la información corregida.

```r
write.csv(gasto_f, file="GastoSanitario_Financiacion_clean.csv", row.names = FALSE)
```