Número/Ratio de Camas por propiedad y paises

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Contents

1.PROCESAMIENTO DE LOS DATOS.

- En primer lugar leemos el fichero:

```
camas<-read.csv("C:/temp/Camas_Propiedad.csv",sep= ",")
```

- Realicemos una breve inspección de los datos

```
str(camas)
```

```
## 'data.frame':    2790 obs. of  6 variables:
##  $ TIME             : int  2010 2010 2010 2010 2010 2010 2010 2010 2010 2010 ...
##  $ GEO              : Factor w/ 31 levels "Austria","Belgium",..: 2 2 2 2 2 2 2 2 2 3 ...
##  $ OWNER            : Factor w/ 3 levels "For-profit private ownership",..: 3 3 3 2 2 2 1 1 1 3 ...
##  $ UNIT             : Factor w/ 3 levels "Inhabitants per ...",..: 2 1 3 2 1 3 2 1 3 2 ...
##  $ Value            : Factor w/ 1704 levels ":","0.00","0.98",..: 454 1426 385 1225 643 1174 1 1 1 ...
##  $ Flag.and.Footnotes: Factor w/ 4 levels "","b","e","p": 1 1 1 1 1 1 1 1 1 1 ...
```

```
colnames(camas) #Nombre de las variables
```

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

```
nrow(camas) #Número de registros
```

```
## [1] 2790
```

```
ncol(camas) #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.
- **OWNER**: variable cualitativa. Indica la propiedad de las camas hospitalarias.
- **Value**: Variable cuantitativa. Indica el número y ratio de camas por propiedad y por países.
- **Fal.and.footnotes**. Notas sobre etiquetas. Eliminamos esta columna.

*Años de las mediciones:

```
unique(camas$TIME)
```

```
##  [1] 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
```

*Paises:

```
unique(camas$GEO)
```

```
##  [1] Belgium
##  [2] Bulgaria
##  [3] Czechia
##  [4] Denmark
##  [5] Germany (until 1990 former territory of the FRG)
##  [6] Estonia
##  [7] Greece
##  [8] Spain
##  [9] France
## [10] Croatia
## [11] Italy
## [12] Cyprus
## [13] Latvia
## [14] Lithuania
## [15] Hungary
## [16] Malta
## [17] Netherlands
## [18] Austria
## [19] Poland
## [20] Portugal
## [21] Romania
## [22] Slovenia
## [23] Finland
## [24] Iceland
## [25] Liechtenstein
## [26] Norway
## [27] United Kingdom
## [28] Montenegro
## [29] North Macedonia
## [30] Serbia
## [31] Turkey
## 31 Levels: Austria Belgium Bulgaria Croatia Cyprus Czechia Denmark ... United Kingdom
```

*Unidad de las mediciones:

```
unique(camas$UNIT)
```

```
## [1] Number                       Inhabitants per ...
## [3] Per hundred thousand inhabitants
## Levels: Inhabitants per ... Number Per hundred thousand inhabitants
```

- Tipo de propiedad en relación a las camas.

```
unique(camas$OWNER)
```

```
## [1] Public ownership             Not-for-profit private ownership
## [3] For-profit private ownership
## 3 Levels: For-profit private ownership ... Public ownership
```

- Eliminamos la columna Fal.and.footnotes.

```
camas<-camas[,-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.

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

```r
camas$Value<-(gsub(' ','',camas$Value) )
camas$Value<-as.numeric(camas$Value)
```

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

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

```r
table(camas$Value, useNA = "ifany")
```

```
## 
##       0    0.98    1.13     1.3    1.73    1.81    1.88    2.03
##     243       1       1       1       1       1       1       1
##    2.38    2.39     2.4    2.41    2.42    2.54    2.66    2.69
##       1       3       2       1       1       1       1       1
##    2.97       3    3.29     3.3    3.33    3.34    3.35    3.36
##       1       2       1       1       1       1       1       1
##    3.39    3.42    3.63       4    4.47    4.87    4.89    4.95
##       1       1       1       8       1       1       3       2
##    4.96    4.97    4.98    5.21    5.31    5.44    5.45    5.53
##       1       1       1       1       1       1       1       1
##    5.58    5.61    5.65    5.85       6    6.16    6.32    6.33
##       1       1       1       1       1       1       1       1
##    6.45    6.49    6.51    6.55     6.6    7.23    7.36    7.71
##       1       1       1       1       1       1       1       1
##    8.12    8.14    8.15    8.28    8.31    8.34    8.43    8.44
##       1       1       1       1       1       1       1       1
##    8.81    9.59    9.93   10.02    10.1   10.15   10.43   10.46
##       1       1       1       1       1       1       1       1
##   10.56   10.61   10.67   10.74   10.82   10.84   10.91   11.02
##       1       1       1       1       1       1       1       1
##   11.03    11.1   11.15   11.42   11.52   11.54   11.78   11.83
##       1       1       1       1       1       1       1       1
##   11.86   12.22   12.26    12.3   12.32   12.39   12.46   12.49
##       1       1       1       1       1       1       1       1
##   12.61   12.62    12.7   12.77   12.91   12.92    13.1   13.18
##       1       1       1       1       1       1       1       2
##   13.38    13.8   13.81   13.88   14.78   15.43   15.87   16.99
##       1       1       1       1       1       1       1       1
##   17.48   18.87   18.89   19.23   20.32   20.63   20.85      21
##       1       1       1       1       1       1       1       1
##   22.29   22.35   23.57   23.68   23.76   23.79   24.02   24.16
##       1       1       1       1       2       1       1       1
##   24.27   24.41   24.62   25.56   25.58   26.49   26.59   26.79
##       1       1       1       1       1       1       1       1
##   26.82   27.14   28.12   28.24   28.41   28.67   28.68   28.99
##       1       1       1       1       1       1       1       1
##    29.8   30.59   32.78   33.14   33.73   34.93      35   35.76
##       1       1       1       1       1       1       2       1
##   36.07   36.28   36.35   36.41   36.52   36.53   36.93   36.99
##       1       1       1       1       1       1       1       1
##      37   37.04   37.18   37.49   38.41   38.53   39.44   39.56
##       1       1       1       1       1       1       1       1
##   40.89   41.21   43.17   47.02   50.98    51.9      52   52.11
##       1       1       1       1       1       1       1       1
##   53.46      54   54.42   55.62   55.63   55.79   55.89      56
```

```
##      1      1      1      1      1      1      1      2
##  56.07  56.18  56.33  56.62  56.64     57   57.1  57.11
##      1      1      1      1      2      2      1      1
##  57.17  57.25  57.27  60.76  61.79  63.95  65.45  66.68
##      1      1      1      1      1      1      1      1
##  66.71     67  67.22  67.38  67.39  69.94   70.1  71.53
##      1      1      1      1      1      1      1      1
##     74  78.72  84.03  84.47  85.16  85.23  85.42  86.22
##      3      1      1      1      1      1      1      1
##  86.23   88.4  88.84  89.05     90   90.4  90.74   91.1
##      1      1      1      1      1      1      1      1
##  91.51  92.05  92.08  92.52  93.21  93.42  94.54  96.88
##      1      1      1      1      1      1      1      1
##  96.94  97.11  97.19  97.47  97.63  97.77  98.33  98.85
##      1      1      1      1      1      1      1      1
##   99.3  99.57  99.98 100.07  100.3 100.86    101 101.01
##      1      1      1      1      1      1      4      1
## 101.35 101.87    102 102.03 102.14    105    108    110
##      1      1      5      1      1      1      2      1
##    114 116.79 118.64 120.06 120.75    121 121.59    122
##      1      1      1      1      1      1      1      1
## 127.43 128.02    129 129.86    131 131.79 133.47 135.03
##      1      1      1      1      1      1      1      1
## 135.18 135.43 135.59 135.65 136.45 136.58 137.73 137.83
##      1      1      1      1      1      1      1      1
## 138.29 138.34 138.52  138.8  139.2    140 140.33 140.69
##      1      1      1      1      1      6      1      1
## 142.21 142.25    143 143.33 143.44 143.78 144.83 145.05
##      1      1      2      1      1      1      1      1
## 145.58 145.61 146.32 146.51 147.06 148.48 148.76 149.36
##      1      1      1      1      1      1      1      1
## 149.67 150.03 150.11 150.33 150.59 150.71    151 151.71
##      1      1      1      1      1      1      1      1
##    152 152.06 152.56 153.03 153.23 153.77 153.84    154
##      1      1      1      1      1      1      1      1
## 154.12 154.71    155 155.38 156.42 156.47 157.04 157.07
##      1      1      1      1      1      1      1      1
## 157.24 159.24 159.49 160.56    161 161.08 161.11 161.55
##      1      1      1      1      1      1      1      1
## 162.35 162.46 162.71 163.28 163.93    164  164.3 165.67
##      1      1      1      1      1      1      1      1
##  166.2    167 167.49 168.99 169.15    170 171.54 172.12
##      1      1      1      1      1      1      1      1
## 172.63 172.88 173.18 173.54 173.59 173.93 174.09 174.88
##      1      1      1      1      1      1      1      1
## 174.89    175  175.2 175.24 176.05 176.25 176.55 176.86
##      1      1      1      1      1      1      1      1
## 176.93 177.04 177.23 177.75 177.95 178.29  178.3 178.38
##      1      1      1      1      1      1      1      1
## 178.51  178.6 178.64 178.67 178.88    179 179.12  179.2
##      1      1      1      1      1      1      1      1
## 179.49 179.76 180.97    181  181.4 181.85    182 182.53
##      1      1      1      2      1      1      1      1
## 182.69 183.43 183.79 184.19 184.35 184.92    185 185.22
```

```
##       1       1       2       1       1       1       1       1
## 185.38  186.21  186.43  186.89     187  187.51   187.9  188.05
##       1       1       1       1       1       1       1       1
## 188.32  189.93  190.36  190.67  190.95  191.65  194.23  194.49
##       1       1       1       1       1       1       1       1
## 194.54     195  196.05     197  197.94     198  199.86  200.04
##       1       1       1       1       1       1       1       1
## 201.87  202.54  202.72  203.41  203.56   203.6  203.79  203.98
##       1       1       1       1       1       1       1       1
## 204.58  205.43  205.74  206.25  206.28  207.27  208.88  209.13
##       1       1       1       1       1       1       1       1
## 209.21     210  210.64  210.74  210.89   210.9  212.24  212.91
##       1       1       1       1       1       1       1       1
##  213.7  214.17  214.24  214.55  215.03  215.38  216.06  216.78
##       1       1       1       1       1       1       1       1
## 217.66  217.85  218.32   218.6     220  221.11   222.1  222.47
##       1       1       1       1       1       1       1       1
## 222.48  222.67  222.82  223.96  224.78  225.13  225.18  225.32
##       1       1       1       1       1       1       1       1
## 225.46   226.9  227.11  227.13   227.2  228.35  228.85  229.27
##       1       1       1       1       1       1       1       1
## 229.35  230.05  230.24  230.31  230.59  231.21  231.67  231.78
##       1       1       1       1       1       1       1       1
## 231.96   232.2  232.73  232.95  232.98  233.49   233.6     234
##       1       1       1       1       1       1       1       1
## 234.05  234.24  234.34  234.46  234.56   234.8  234.91     235
##       1       1       1       1       1       1       2       1
## 236.03  236.62  236.83   237.4  238.07  238.08  239.11     240
##       1       1       1       1       1       1       1       1
## 240.63  240.86     241  242.38   242.4  242.97  243.04  243.05
##       1       1       1       1       1       1       1       1
## 244.37   244.6  244.61  244.64  244.76  245.23  246.36  246.43
##       1       1       1       2       1       1       1       1
##  246.7  246.89  247.13  247.22  247.71  247.79  248.69   249.3
##       1       1       1       1       1       1       1       1
## 249.49  249.54  250.19  251.19  251.45  251.66     252  252.19
##       1       1       1       1       1       1       1       1
##    253  253.48   253.7     254  254.22  254.36  254.42  255.55
##       6       1       1       1       1       1       1       1
##    256   256.4  257.12  257.48     258   258.8     259     260
##       1       1       1       1       1       1       1       1
## 260.42  261.06  262.66  264.22   266.4  266.77     267     268
##       1       1       1       1       1       1       1       3
##  268.1     269     270  271.37     272  272.94  273.76  273.95
##       1       1       1       1       1       1       1       1
## 274.25  275.11  275.47  275.68  276.12  276.53  276.86     277
##       1       1       1       1       1       1       1       1
## 277.28  278.98  280.75  280.85     284  286.55     287  287.48
##       1       1       1       1       1       1       1       1
## 287.66  288.25  290.58  292.15  292.88  293.17  293.64  294.12
##       1       1       1       1       1       1       1       1
## 294.75  295.89  296.97  296.98  297.09  298.74  299.29  299.35
##       1       1       1       1       1       1       1       1
## 300.62  301.16  301.63     302  302.09  303.82  305.17  305.95
```

```
##       1       1       1       1       1       1       1       1
##     306  306.35  306.76  308.08  308.31     310  310.42     311
##       1       1       1       1       1       2       1       1
##  311.96  312.14     313  313.31  313.32   315.9     316  316.14
##       1       1       3       1       1       1       1       1
##  316.31  316.55     317     319  319.16  319.17     320  320.37
##       1       1       1       1       1       1       1       1
##  320.56  322.15  324.35  324.59     325  325.98  326.43  326.85
##       1       1       1       1       1       1       1       1
##  327.68     329  329.14     330  331.03  331.53  332.04  332.65
##       1       1       1       1       1       1       1       1
##  334.05  334.12  334.74  336.59  336.72  336.73  337.96  339.27
##       1       1       1       1       1       1       1       1
##     340  340.56   341.1  341.44  342.29  344.14     345  346.92
##       1       1       1       1       1       1       1       1
##  347.63  347.85  348.98     353     355  356.07  356.18  358.44
##       1       1       1       1       1       1       1       1
##  360.65  361.19  361.63  362.16  362.73  363.01  363.49  364.63
##       1       1       1       1       1       1       1       1
##  365.03  365.29  366.38   368.5     372     373  374.85  375.38
##       1       1       1       1       1       1       1       1
##     376     378  378.47  380.72  383.05     384   386.1   386.4
##       1       1       1       1       1       1       1       1
##  388.39  388.92  390.02  391.31  393.06  393.15  393.37  394.17
##       1       1       1       1       1       1       1       1
##   394.5  396.53  396.83  397.36  397.69  398.11  399.69  400.74
##       1       1       1       1       1       1       1       1
##  400.81     401  401.12  402.11  403.57   403.7   404.5  404.65
##       1       1       1       1       1       1       1       1
##     405  405.04  405.35  405.79  405.91     406  407.77  408.56
##       1       1       1       1       1       1       1       1
##  408.76  408.81  408.83  409.21  411.44  411.46  411.57  412.54
##       2       1       1       1       1       1       1       1
##  412.58  415.18  415.57  416.66  418.22  420.03  420.05  421.23
##       1       1       1       1       1       1       1       1
##  422.25  422.62  423.67  425.69  425.89  426.33  426.52  426.72
##       1       1       1       2       1       1       1       1
##  426.91  427.26  428.08  428.29  429.23  429.27  429.69  430.66
##       1       1       1       1       1       1       1       1
##   431.1  431.44  431.64  432.51  433.66  434.19  434.33   434.7
##       1       1       1       1       1       1       1       1
##  436.01  436.17  436.96  437.92  440.15  440.27  440.31  440.73
##       1       1       1       1       1       1       1       1
##  443.54  443.82  444.08  444.18  444.88  446.52  448.79   449.1
##       1       1       1       1       1       1       1       1
##  449.49   449.5  450.25  452.26  457.46  458.04  459.02  459.44
##       1       1       1       1       1       1       1       1
##  461.29  462.84     463  464.29  465.04  466.09  466.76  466.91
##       1       1       1       1       1       1       1       1
##  467.95     468  469.68  471.17     474  474.16  474.18  474.51
##       1       1       1       1       1       1       1       1
##  474.74     478  478.18  478.74  482.45  484.78  484.85  486.05
##       1       1       1       1       1       1       1       1
##  486.78  488.82  490.25   490.7     491  491.17  491.25  491.62
```

```
##       1       1       1       1       1       1       1       1
##  493.29  493.73  495.36   499.9  500.35  505.06  505.21     508
##       1       1       1       1       1       1       1       1
##  510.09  512.81  514.04  514.18  514.87  521.79     522  523.71
##       1       1       1       1       1       1       1       1
##  524.47  525.33  526.52     530  531.01  531.76  532.21  533.31
##       1       1       1       1       1       1       1       1
##  535.08   536.4  537.02  539.44  539.89  540.79  542.45  542.93
##       1       1       1       1       1       1       1       1
##  544.09  544.11  545.17  547.39  547.85  549.91  551.28  552.48
##       1       1       1       1       1       1       1       1
##  552.58  556.31  557.14     558  558.02  558.29  559.03  559.69
##       1       1       1       1       1       1       1       1
##   559.8  559.91  560.21  560.59  560.86   560.9  561.97  562.59
##       1       1       1       1       1       1       1       1
##  564.25  564.85     565  565.21   565.4  566.42  567.39  568.03
##       1       1       1       1       1       1       1       1
##     570  570.64  570.77  571.79  571.81  574.41  574.95  576.08
##       1       1       1       1       1       1       1       1
##  576.24  577.42  578.44  579.28  580.99  582.94     584  591.18
##       1       1       1       1       1       1       1       1
##  591.75  597.06  601.67   603.6  608.64  610.01     612  612.43
##       1       1       1       1       1       1       2       1
##   614.6  615.53  615.96     619  620.69  620.79  622.82  626.99
##       1       1       1       1       1       1       1       1
##  627.99     628     632  635.95  636.66  636.79   639.1  639.31
##       1       1       1       1       1       1       1       1
##     643  643.59  646.37  648.83  650.01  650.33  652.62  653.46
##       1       1       1       1       1       1       1       1
##     655  655.48  657.63  659.14  663.54  664.05  665.19  666.18
##       1       1       1       1       1       1       1       1
##  666.52  668.13  669.54  672.22   673.5  680.01  682.57  683.44
##       1       1       1       1       1       1       1       1
##  686.79  686.89  689.42  690.45  695.52  697.14  697.69     703
##       1       1       1       1       1       1       1       1
##   703.2  710.78   712.6  718.37  720.45  721.91  722.86   723.1
##       1       1       1       1       1       1       1       1
##  725.51  726.05  732.17  732.89   737.2  737.51  738.37  739.77
##       1       1       1       1       1       1       1       1
##  740.57  749.23   758.8     766  770.09  781.11  784.74     814
##       1       1       1       1       1       1       1       1
##  822.43     828  828.15  832.93  842.85  856.23     881     884
##       1       1       1       1       1       1       1       1
##     894     899     924     928  979.08  980.12  981.63  986.67
##       1       1       1       1       1       1       1       1
##  989.96   991.5  996.97  999.28 1000.22 1004.35 1007.07    1009
##       1       1       1       1       1       1       1       1
##  1011.6    1014 1017.03 1022.83 1024.27    1026 1028.87  1029.8
##       1       1       1       1       1       1       1       1
##  1031.6    1032  1032.2    1035    1037    1041    1042    1043
##       1       1       1       1       1       1       1       1
##    1050    1051    1052 1057.75    1060 1070.43    1072 1072.87
##       2       1       1       1       1       1       1       1
##    1076 1080.83 1085.99 1086.37 1092.74    1094 1097.71 1102.02
```

```
##       1        1        1        1        1        1        1        1
##    1105   1106.2     1109     1119     1120  1122.95  1125.59  1131.22
##       1        1        1        1        1        1        1        1
##    1140   1159.7  1159.79  1170.67  1173.29  1174.31  1183.83  1190.08
##       1        1        1        1        1        1        1        1
## 1270.28     1302     1307     1308     1310     1314     1333     1356
##       1        1        1        1        1        1        1        1
##    1361     1368     1372     1385  1398.02     1413  1426.63  1429.72
##       1        1        1        1        1        1        1        1
##    1444     1445     1447     1471  1483.97  1484.15   1487.6  1492.45
##       1        1        1        1        1        1        1        1
## 1499.12  1499.69     1514     1517     1525     1527  1527.77     1534
##       1        1        1        1        1        1        1        1
##    1543     1562  1563.76     1564     1615  1618.41  1645.94     1710
##       1        1        1        1        1        1        1        1
## 1746.11  1746.77  1749.06  1751.15  1751.47  1765.58  1765.65  1766.22
##       1        1        1        1        1        1        1        1
##    1772  1775.36  1779.99   1783.6  1789.33  1792.46  1797.74  1797.82
##       1        1        1        1        1        1        1        1
## 1837.67     1863  1870.49     1889     1913  1919.17  1926.89     1933
##       1        1        1        1        1        1        1        1
## 1961.63     1980     2005     2009     2055     2085  2126.87  2316.24
##       1        1        1        1        1        1        1        1
##    2403     2416  2426.49     2435  2445.37     2446     2466  2527.49
##       1        1        1        1        1        3        3        1
##  2535.4  2595.61  2603.73  2667.54  2689.37     2699  2699.55  2703.71
##       1        1        1        1        1        1        1        1
## 2708.18  2737.59  2738.32  2746.86   2750.7  2756.51     2767  2772.16
##       1        1        1        1        1        1        1        1
## 2796.71  2862.48  2964.95     3015  3017.45  3050.55     3065  3269.55
##       1        1        1        1        1        1        1        1
## 3355.63     3428  3449.62  3486.76  3487.51     3508  3520.38  3541.16
##       1        1        1        1        1        1        1        1
## 3555.63     3627     3683  3684.45  3728.91  3732.43     3759  3760.45
##       1        1        1        1        1        1        1        1
##    3770  3775.49     3883  3909.15  3911.66     3959     3962  4061.49
##       1        1        1        1        1        1        1        1
## 4096.85  4120.86  4138.64  4162.68   4203.8  4208.55  4208.89  4223.57
##       1        1        1        1        1        1        1        1
## 4243.05  4474.24     4483  4487.31  4796.17  4846.14  4922.15  5199.99
##       1        1        1        1        1        1        1        1
##    5293  5293.21  5299.23     5582     5720  5722.33     5793     5822
##       1        1        1        1        1        1        1        1
## 5885.25     5933     6037     6038     6107     6263  6299.36     6321
##       1        1        1        1        1        1        1        1
##    6355     6429  6482.82     6533     6567  6766.85     6808     6883
##       1        1        1        1        1        1        1        1
##    6980     7014     7046     7074     7122     7155  7203.73     7220
##       1        1        1        1        1        1        1        1
##    7222  7241.74  7248.38     7356     7380     7406     7444     7453
##       1        1        1        1        1        1        1        1
## 7473.29     7527     7582     7586  7587.02  7588.35     7597   7633.5
##       1        1        1        1        1        1        1        1
##    7640  7737.69  7747.74     7813  7831.63  7876.31  7923.65  7928.65
```

```
##        1         1         1         1         1         1         1         1
##     7967   8005.14   8024.13      8025   8068.36   8116.84   8129.63   8156.33
##        1         1         1         1         1         1         1         1
##     8167   8186.27   8431.31   8451.22      8478      8485   8488.96      8559
##        1         1         1         1         1         1         1         1
##     8667   8677.07      8729      8730      8743   8754.81      8801      8806
##        1         1         1         1         1         1         1         1
##     8818      8826      8873      8905      8960   8965.75      8995   9005.38
##        1         1         1         1         1         1         1         1
##  9063.31      9078      9082   9164.13      9165      9193      9214   9221.36
##        1         1         1         1         1         1         1         1
##     9237   9245.88      9247      9254      9265      9275   9311.88    9373.5
##        1         1         1         1         1         1         1         1
##     9391      9429   9466.72      9515    9561.5   9592.02      9718   9850.76
##        1         1         1         1         1         1         1         1
##  9896.59    9983.1  10072.88     10089     10141     10170     10210     10223
##        1         1         1         1         1         1         1         1
##    10230     10273     10316     10358     10429  10431.49     10437     10508
##        1         1         1         1         1         1         1         1
##    10528     10597     10675     10697     10890     10912     11061     11154
##        1         1         1         1         1         1         1         1
##    11185     11223     11263     11318  11345.36     11417     11450     11515
##        1         1         1         1         1         1         1         1
##    11519  11854.02  11867.11  11986.62  12029.84  12076.83  12272.57   12282.5
##        1         1         1         1         1         1         1         1
##    12283  12321.73     12609  12962.42     13163     13415  13580.79  13834.62
##        1         1         1         1         1         1         1         1
##    13922     14088     14126     14172     14232     14241     14446     14659
##        1         1         1         1         1         1         1         1
##    14701     14853     14878     14956     14976     14995     15119     15142
##        1         1         1         1         1         1         1         1
## 15143.47     15185     15206     15264  15264.44  15359.11   15409.9  15510.93
##        1         1         1         1         1         1         1         1
##    15665   15806.2  15816.71     16185  16228.55     16316     16384     16421
##        1         1         1         1         1         1         1         1
##    16636     16644  16676.02  16737.96     16754     16899     16903     16960
##        1         1         1         1         1         1         1         1
## 17101.44     17200     17218     17243     17258     17271     17401     17606
##        1         1         1         1         1         1         1         1
## 17698.75   17815.1     17840  17906.35     17979     18032  18069.43     18136
##        1         1         1         1         1         1         1         1
##    18150  18333.82  18366.25     18394     18436     18536   18839.8     18879
##        1         1         1         1         1         1         1         1
##    19032     19047  19184.22     20057  20084.14  20125.91  20168.22  20195.62
##        1         1         1         1         1         1         1         1
## 20215.49     20431  20445.96  20459.28   20533.6     20798     21169     21387
##        1         1         1         1         1         1         1         1
##    22015     22026  22384.48     22401     22470     22508     22552     23034
##        1         1         1         1         1         1         2         1
##    23813     24027     24050     24056     24111     24206     24516     24611
##        1         1         1         1         1         1         1         1
##    24702     24730     25004     25344     25395     25786     25828     26009
##        1         1         1         1         1         1         1         1
##    26048     26113     26140     26207     26328     26371     26599     26639
```

```
##        1         1         1         1         1         1         1         1
##    26791     27352  27528.31     28306   29220.5     29495  29498.95     29521
##        1         1         1         1         1         1         1         1
##    29566  29803.15  29853.58     29879  29950.49     30024  30057.09     30157
##        1         1         1         1         1         1         1         1
## 30257.59     30322   30389.1     31578     32814  33305.05   33343.4     33383
##        1         1         1         1         1         1         1         1
## 33679.77     34288     34898  37174.47  37523.93     39014     39171     39276
##        1         1         1         1         1         1         1         1
##    39299  39366.24     39377     39395     39396     39399     39458     39594
##        1         1         1         1         1         1         1         1
##    40301     40461     40564     40928     41037     41043     41128     41232
##        1         1         1         1         1         1         1         1
## 41323.18     41437  41558.39  41602.16  41684.03  41764.16   41805.1  41875.25
##        1         1         1         1         1         1         1         1
## 42015.52     43112     44067     44650     44823     44910     45029     45055
##        1         1         1         1         1         1         1         1
##    45097     45107     45235     45367     45381     45592  47224.31     47522
##        1         1         1         1         1         1         1         1
##    47612     47779     47984     48169     48354     48445     48495     48553
##        1         1         1         1         1         1         1         1
##    48649  49157.97     50697  53255.74     53553     54547     54724  55248.75
##        1         1         1         1         1         1         1         1
##    55325     55827     55903     55956     56136     56270     56271     56289
##        1         1         1         1         1         1         1         1
##    56425     56482     56994     57176     57384  57923.75     57997     58090
##        1         1         1         1         1         1         1         1
##    58137     58241     58385     58818     59117     59590     59603     59787
##        1         1         1         1         1         1         1         1
##    59837     59850     59999     60387     60824     61281     62138     63080
##        1         1         1         1         1         1         1         1
##    63354     64339     65673     67549     67732     69427     69552     69793
##        1         1         1         1         1         1         1         1
## 77146.29  88696.18     94546     94640     94869     94901     95015     95039
##        1         1         1         1         1         1         1         1
##    95983     96484     96988     97150     97250     97497     97516     97751
##        1         1         1         1         1         1         1         1
##    97763     98008     98545     99533 102085.72    126406    127082    127109
##        1         1         1         1         1         1         1         1
##   127281    127321    127350    127531    127560    127716    128483    129082
##        1         1         1         1         1         1         1         1
##   131213    131759    131780    135606    139467    142887    147780    159606
##        1         1         1         1         1         1         1         1
##   160594    161058    162126    162769 163873.04 165844.39    167074    167589
##        1         1         1         1         1         1         1         1
##   168661    168934    169995    172310    176324    176791    177189    178841
##        1         1         1         1         1         1         1         1
##   181972    183831    184549    190175    191111    193286    193358    195052
##        1         1         1         1         1         1         1         1
##   197267    198412    198736    198877    198911    199842    200012    200206
##        1         1         1         1         1         1         1         1
##   200280    200672    200889    201218    201425    202523    243417    246395
##        1         1         1         1         1         1         1         1
##   250104    253364    256229    256957    258158    258444    260642    269158
```

```
##           1           1           1           1           1           1           1           1
##      269448      270813      271079      271236      271557      273382      273789        <NA>
##           1           1           1           1           1           1           1         786
```

- Observamos que tenemos **786 valores perdidos**.Guardamos en la variable **idx** los índices de los registros con valores **NA** de la variable **Value**.

```
idx<-which(is.na(camas$Value))
length(idx)
```
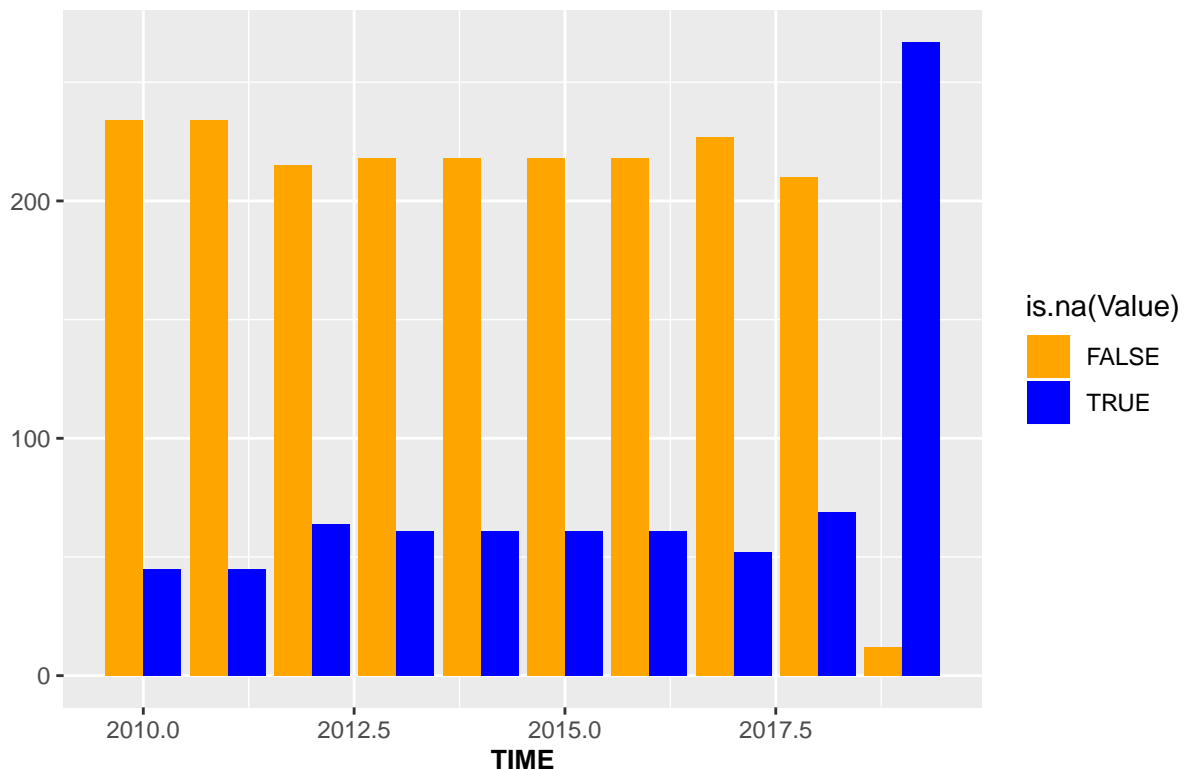
```
## [1] 786
```

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

```
library(ggplot2)
library(scales)
g = ggplot(camas, 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(camas, variable=c("Value"),k=3)
camas<-output
```

- Comprobamos que no tenemos valores nulos después de la imputación

```
g = ggplot(camas, 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))
```

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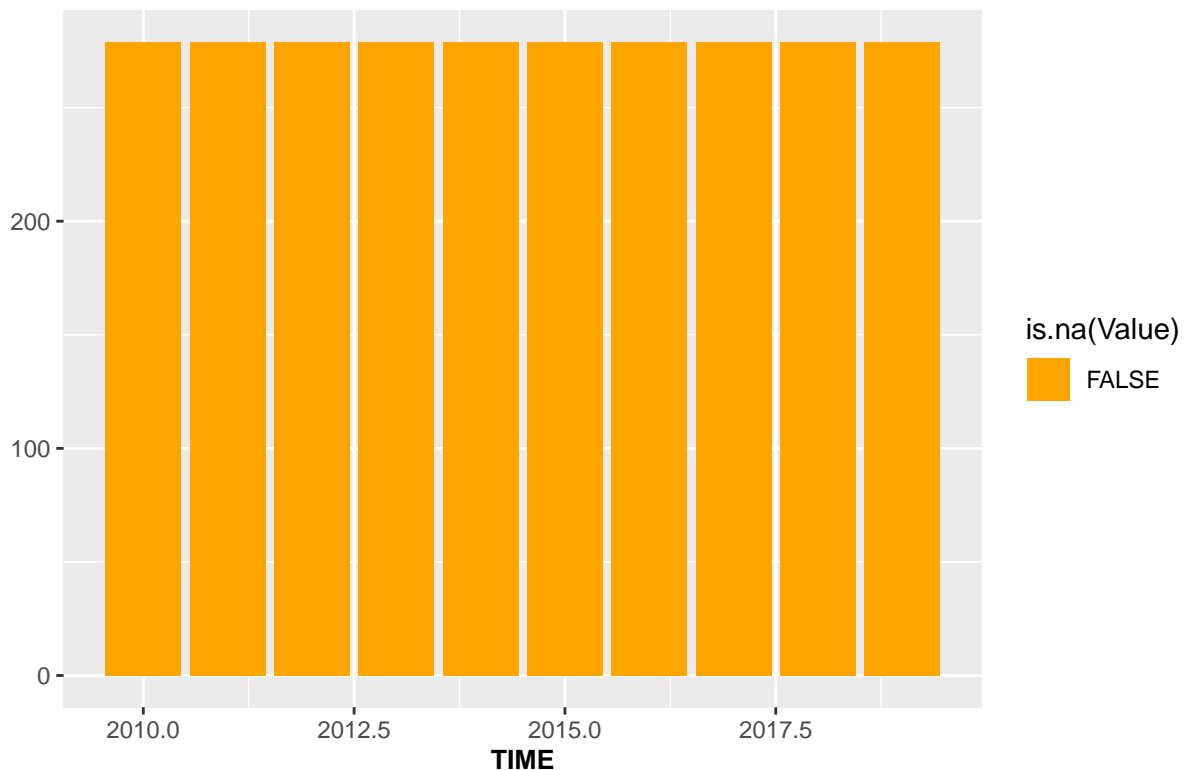
- Con el siguiente gráfico, observaremos que la variable **Value** tiene outliers o valores extremos

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

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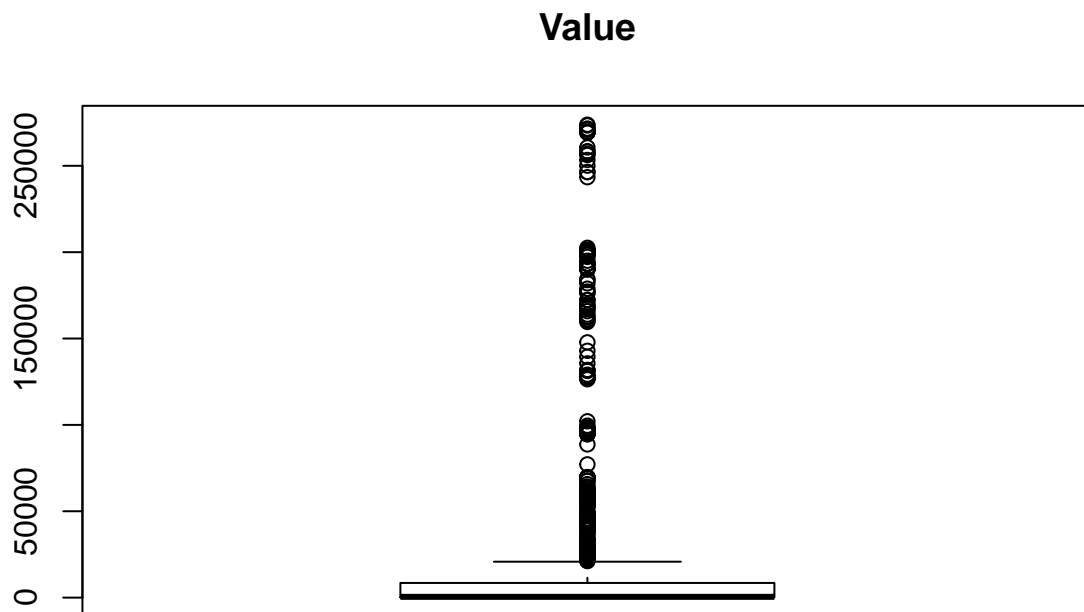
- Por otro lado, revisamos para el resto de columnas si tenemos valores NA.(desconocidos o perdidos)

```r
table(camas$TIME, useNA = "ifany")
```

```
## 
## 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
##  279  279  279  279  279  279  279  279  279  279
```

```r
table(camas$GEO, useNA = "ifany")
```

```
## 
##                                      Austria
##                                           90
##                                      Belgium
##                                           90
##                                     Bulgaria
##                                           90
##                                      Croatia
##                                           90
##                                       Cyprus
##                                           90
##                                      Czechia
##                                           90
##                                      Denmark
##                                           90
```

```
##                                                           Estonia
##                                                                90
##                                                           Finland
##                                                                90
##                                                            France
##                                                                90
## Germany (until 1990 former territory of the FRG)
##                                                                90
##                                                            Greece
##                                                                90
##                                                           Hungary
##                                                                90
##                                                           Iceland
##                                                                90
##                                                             Italy
##                                                                90
##                                                            Latvia
##                                                                90
##                                                     Liechtenstein
##                                                                90
##                                                         Lithuania
##                                                                90
##                                                             Malta
##                                                                90
##                                                        Montenegro
##                                                                90
##                                                       Netherlands
##                                                                90
##                                                   North Macedonia
##                                                                90
##                                                            Norway
##                                                                90
##                                                            Poland
##                                                                90
##                                                          Portugal
##                                                                90
##                                                           Romania
##                                                                90
##                                                            Serbia
##                                                                90
##                                                          Slovenia
##                                                                90
##                                                             Spain
##                                                                90
##                                                            Turkey
##                                                                90
##                                                    United Kingdom
##                                                                90
```

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

```
##
##            Inhabitants per ...                          Number
##                            930                             930
## Per hundred thousand inhabitants
```

```
##                                                930
```

```r
table(camas$OWNER, useNA = "ifany")
```

```
## 
##     For-profit private ownership Not-for-profit private ownership 
##                             930                             930
##                Public ownership 
##                             930
```

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(camas, file="Camas_Propiedad_clean.csv", row.names = FALSE)
```