TP 3

TP 3

```
df <- read.table(file="../../data/INFARCTUS.txt", header=TRUE, sep="", stringsAsFactors=FALSE)
head(df)
```

```
##   Obs C  PRONO FRCAR INCAR INSYS PRDIA PAPUL PVENT REPUL
## 1   1 2 SURVIE    90  1.71  19.0    16  19.5  16.0   912
## 2   2 1  DECES    90  1.68  18.7    24  31.0  14.0  1476
## 3   3 1  DECES   120  1.40  11.7    23  29.0   8.0  1657
## 4   4 2 SURVIE    82  1.79  21.8    14  17.5  10.0   782
## 5   5 1  DECES    80  1.58  19.7    21  28.0  18.5  1418
## 6   6 1  DECES    80  1.13  14.1    18  23.5   9.0  1664
```

1. ACP (selectionner les variables)

(a) Selection des variables

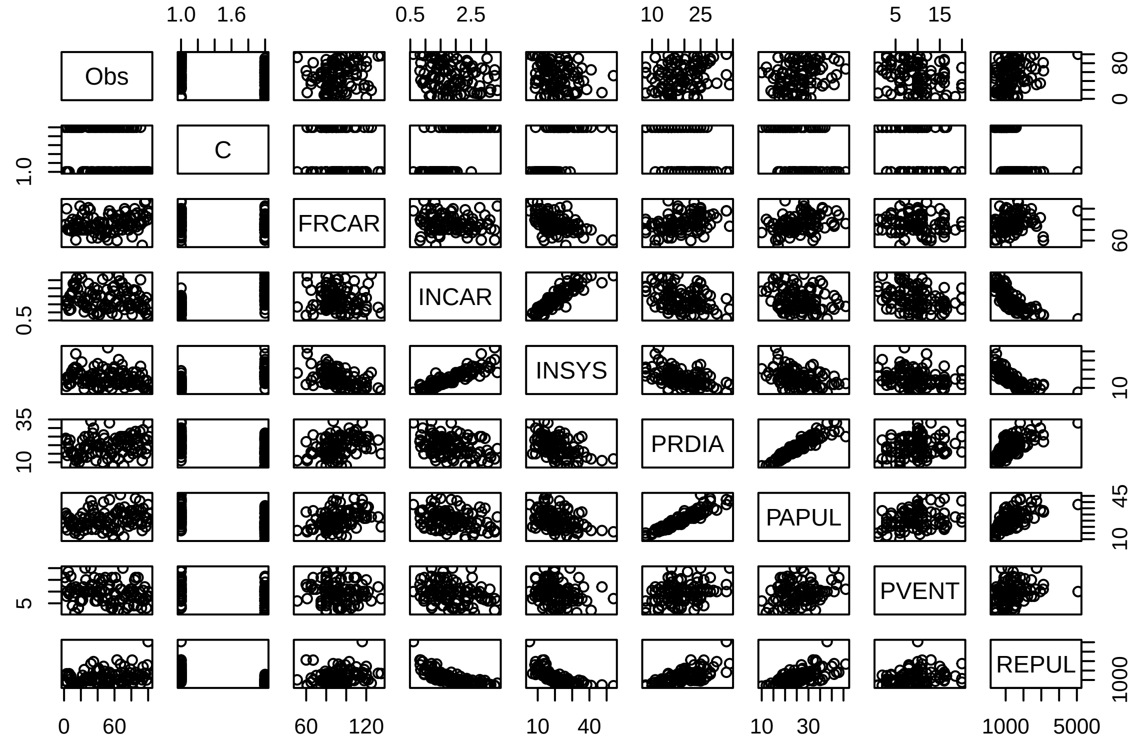
```
Xquanti <- df[, sapply(df, is.numeric)]
Xquanti
```

```
##     Obs C FRCAR INCAR INSYS PRDIA PAPUL PVENT REPUL
## 1     1 2    90  1.71  19.0  16.0  19.5  16.0   912
## 2     2 1    90  1.68  18.7  24.0  31.0  14.0  1476
## 3     3 1   120  1.40  11.7  23.0  29.0   8.0  1657
## 4     4 2    82  1.79  21.8  14.0  17.5  10.0   782
## 5     5 1    80  1.58  19.7  21.0  28.0  18.5  1418
## 6     6 1    80  1.13  14.1  18.0  23.5   9.0  1664
## 7     7 2    94  2.04  21.7  23.0  27.0  10.0  1059
## 8     8 2    80  1.19  14.9  16.0  21.0  16.5  1412
## 9     9 2    78  2.16  27.7  15.0  20.5  11.5   759
## 10   10 2   100  2.28  22.8  16.0  23.0   4.0   807
## 11   11 2    90  2.79  31.0  16.0  25.0   8.0   717
## 12   12 2    86  2.70  31.4  15.0  23.0   9.5   681
## 13   13 2    80  2.61  32.6   8.0  15.0   1.0   460
## 14   14 2    61  2.84  47.3  11.0  17.0  12.0   479
## 15   15 2    99  3.12  31.8  15.0  20.0  11.0   513
## 16   16 2    92  2.47  26.8  12.0  19.0  11.0   615
## 17   17 2    96  1.88  19.6  12.0  19.0   3.0   809
## 18   18 2    86  1.70  19.8  10.0  14.0  10.5   659
## 19   19 2   125  3.37  26.9  18.0  28.0   6.0   665
## 20   20 2    80  2.01  25.0  15.0  20.0   6.0   796
## 21   21 2    82  3.15  38.4  13.0  20.0   6.0   508
```

```
## 22   22 1   110  1.66  15.1  23.0  31.0   6.5  1494
## 23   23 1    80  1.50  18.7  13.0  17.0  12.0   907
## 24   24 1   118  1.03   8.7  19.0  27.0  10.0  2097
## 25   25 1    95  1.89  19.9  25.0  27.0  20.0  1143
## 26   26 1    80  1.45  18.1  19.0  23.0  15.0  1269
## 27   27 1    85  1.30  15.1  13.0  18.0  10.0  1108
## 28   28 1   105  1.84  17.5  18.0  22.0  10.0   957
## 29   29 2   122  2.79  22.9  25.0  36.0  10.0  1032
## 30   30 2    81  1.77  21.9  18.0  27.0  11.0  1220
## 31   31 2   118  2.31  19.6  22.0  27.0  10.0   935
## 32   32 1    87  1.20  13.8  34.0  41.0  20.0  2733
## 33   33 1    65  1.19  18.3  15.0  18.0  13.0  1210
## 34   34 2    84  2.15  25.6  27.0  37.0  10.0  1377
## 35   35 1   103  0.91   8.8  30.0  33.5  10.0  2945
## 36   36 2    75  2.54  33.9  24.0  31.0  16.0   976
## 37   37 2    90  2.08  23.1  20.0  28.0   6.0  1077
## 38   38 2    90  1.93  21.4  11.0  18.0  10.0   746
## 39   39 1    90  0.95  10.6  20.0  24.0   6.0  2021
## 40   40 2    65  2.38  36.6  16.0  22.0  12.0   739
## 41   41 1    95  0.99  10.4  20.0  27.5   8.0  2222
## 42   42 1    95  0.85   8.9  19.0  22.0  15.5  2071
## 43   43 2    86  2.05  23.8  21.0  28.0  10.0  1093
## 44   44 2    82  2.02  24.6  16.0  22.0  14.0   871
## 45   45 1    70  1.44  20.6  19.0  26.5  11.0  1472
## 46   46 2    92  3.06  33.3  10.0  15.0   6.0   392
## 47   47 1    94  1.31  13.9  26.0  40.0  15.0  2443
## 48   48 1    79  1.29  16.3  24.0  31.0  10.0  1922
## 49   49 2    67  1.47  21.9  15.0  18.0  16.0   980
## 50   50 1    75  1.21  16.1  19.0  24.0   4.0  1587
## 51   51 2    80  2.41  30.9  19.0  24.0   7.0   797
## 52   52 2    61  3.28  54.0  12.0  16.0   7.0   390
## 53   53 1   110  1.24  11.3  22.0  27.5  11.0  1774
## 54   54 1   116  1.85  15.9  33.0  42.0  13.0  1816
## 55   55 2    75  2.00  26.7  16.0  22.0   5.0   880
## 56   56 1    92  1.97  21.4  18.0  27.0   3.0  1096
## 57   57 2   110  0.96   8.8  15.0  19.0  16.0  1583
## 58   58 2    95  2.56  26.9   8.0  13.0   3.0   406
## 59   59 2    75  2.32  30.9   8.0  10.0   6.0   345
## 60   60 2    80  2.65  33.1  13.0  19.0   9.0   574
## 61   61 1   102  1.60  15.7  24.0  31.0  16.0  1550
## 62   62 2    86  1.67  19.4  18.0  23.0   8.5  1102
## 63   63 1    60  0.82  13.7  22.0  32.0  13.0  3122
## 64   64 2   100  1.76  17.6  23.0  33.0   2.0  1500
## 65   65 2    80  3.28  41.0  12.0  17.0   2.0   415
## 66   66 2   108  2.96  27.4  24.0  35.0   6.5   946
## 67   67 1    92  1.37  14.8  25.0  46.0  11.0  2686
## 68   68 1   100  1.38  13.8  20.0  31.0  11.0  1797
## 69   69 2    80  2.85  35.6  25.0  32.0   7.0   898
## 70   70 1    87  2.51  28.8  16.0  24.0  20.0   765
## 71   71 2   100  2.31  23.1   8.0  12.0   1.0   416
## 72   72 1   120  1.18   9.9  25.0  36.0   8.0  2441
## 73   73 1   115  1.83  15.9  25.0  30.0   8.0  1311
## 74   74 2   101  2.55  25.2  23.2  30.5   9.0   957
## 75   75 2    92  2.17  23.5  19.0  24.0   3.0   885
```

```
## 76    76 1    87  1.42  16.1  20.0  26.0  10.0  1465
## 77    77 2    80  1.59  19.9  13.0  20.5   4.0  1031
## 78    78 1    88  1.47  16.7  23.0  32.5  10.0  1769
## 79    79 1   104  1.23  11.8  27.0  33.0  11.0  2146
## 80    80 2    90  1.45  16.1  17.0  24.0   8.5  1324
## 81    81 1    67  0.85  12.7  26.0  33.0  11.0  3106
## 82    82 2    87  2.37  27.2  15.0  22.0  10.0   743
## 83    83 2   108  2.40  22.2  26.0  31.0   4.0  1033
## 84    84 1   120  1.91  15.9  18.0  27.0  15.0  1131
## 85    85 1   108  1.50  13.9  28.0  43.0  16.0  1813
## 86    86 2    86  2.36  27.4  24.0  34.0   8.0  1153
## 87    87 1   112  1.56  13.9  24.0  29.0   4.0  1487
## 88    88 1    80  1.34  17.0  16.0  25.0  16.0  1493
## 89    89 1    95  1.65  17.4  20.0  33.0   7.0  1600
## 90    90 1    90  2.04  22.7  28.0  41.0  10.0  1608
## 91    91 2    90  3.03  33.6  17.0  23.5   7.0   620
## 92    92 1    94  1.21  12.9  17.0  22.0   3.0  1455
## 93    93 1    51  1.34  26.3  11.0  17.0   6.0  1015
## 94    94 1   110  1.17  10.6  29.0  35.0  10.5  2393
## 95    95 1    96  1.74  18.1  24.0  29.0   6.0  1333
## 96    96 1   132  1.31   9.9  23.0  28.0  12.0  1710
## 97    97 1   135  0.95   7.0  15.0  20.0   7.0  1684
## 98    98 1   105  1.92  18.3  18.0  24.0   3.0  1000
## 99    99 1    99  0.83   8.4  23.0  27.0   8.0  2602
## 100  100 1   116  0.60   5.2  33.0  38.0  10.0  5067
## 101  101 1   112  1.54  13.8  25.0  31.0   8.0  1610
```

```
plot(Xquanti)
```



```r
Xquanti <- Xquanti[,-c(1,2)]
Xquanti
```

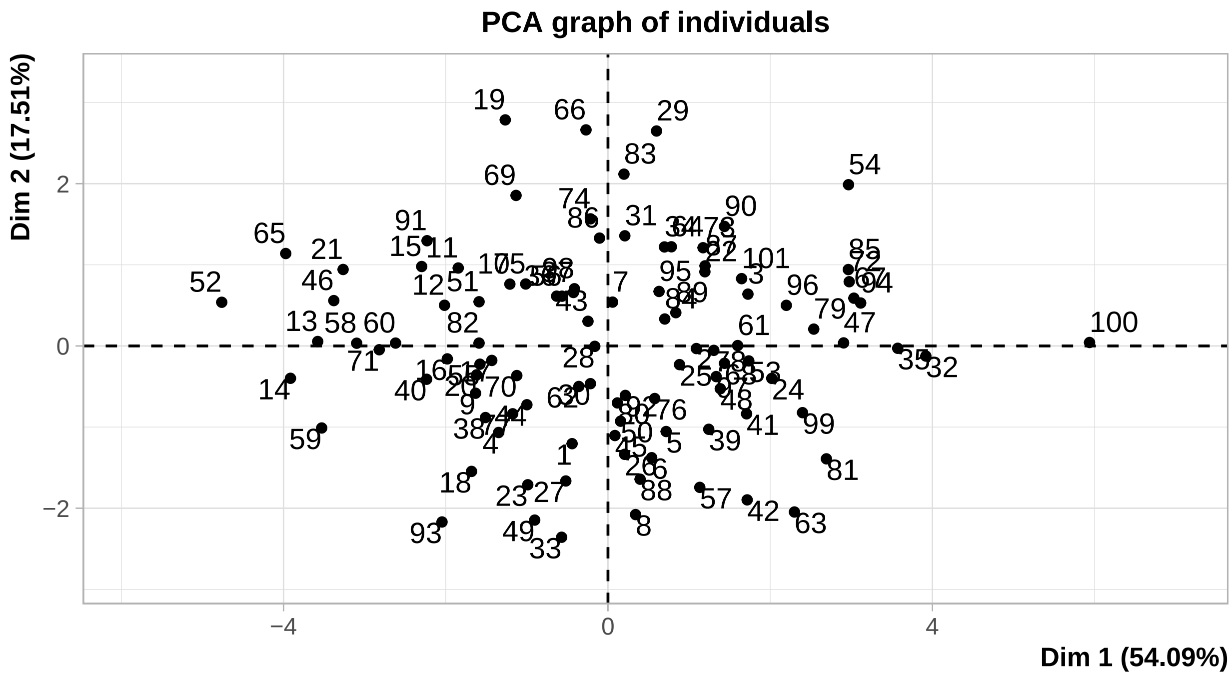
```
##     FRCAR INCAR INSYS PRDIA PAPUL PVENT REPUL
## 1      90  1.71  19.0  16.0  19.5  16.0   912
## 2      90  1.68  18.7  24.0  31.0  14.0  1476
## 3     120  1.40  11.7  23.0  29.0   8.0  1657
## 4      82  1.79  21.8  14.0  17.5  10.0   782
## 5      80  1.58  19.7  21.0  28.0  18.5  1418
## 6      80  1.13  14.1  18.0  23.5   9.0  1664
## 7      94  2.04  21.7  23.0  27.0  10.0  1059
## 8      80  1.19  14.9  16.0  21.0  16.5  1412
## 9      78  2.16  27.7  15.0  20.5  11.5   759
## 10    100  2.28  22.8  16.0  23.0   4.0   807
## 11     90  2.79  31.0  16.0  25.0   8.0   717
## 12     86  2.70  31.4  15.0  23.0   9.5   681
## 13     80  2.61  32.6   8.0  15.0   1.0   460
## 14     61  2.84  47.3  11.0  17.0  12.0   479
## 15     99  3.12  31.8  15.0  20.0  11.0   513
## 16     92  2.47  26.8  12.0  19.0  11.0   615
## 17     96  1.88  19.6  12.0  19.0   3.0   809
## 18     86  1.70  19.8  10.0  14.0  10.5   659
## 19    125  3.37  26.9  18.0  28.0   6.0   665
## 20     80  2.01  25.0  15.0  20.0   6.0   796
## 21     82  3.15  38.4  13.0  20.0   6.0   508
```

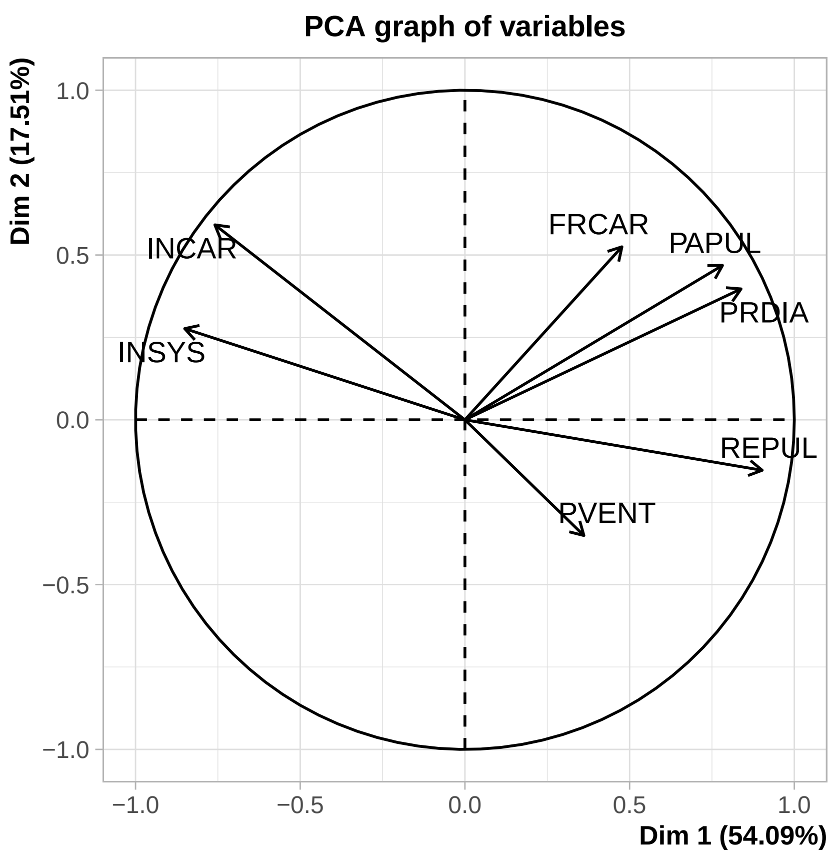
```
## 22   110 1.66 15.1 23.0 31.0  6.5 1494
## 23    80 1.50 18.7 13.0 17.0 12.0  907
## 24   118 1.03  8.7 19.0 27.0 10.0 2097
## 25    95 1.89 19.9 25.0 27.0 20.0 1143
## 26    80 1.45 18.1 19.0 23.0 15.0 1269
## 27    85 1.30 15.1 13.0 18.0 10.0 1108
## 28   105 1.84 17.5 18.0 22.0 10.0  957
## 29   122 2.79 22.9 25.0 36.0 10.0 1032
## 30    81 1.77 21.9 18.0 27.0 11.0 1220
## 31   118 2.31 19.6 22.0 27.0 10.0  935
## 32    87 1.20 13.8 34.0 41.0 20.0 2733
## 33    65 1.19 18.3 15.0 18.0 13.0 1210
## 34    84 2.15 25.6 27.0 37.0 10.0 1377
## 35   103 0.91  8.8 30.0 33.5 10.0 2945
## 36    75 2.54 33.9 24.0 31.0 16.0  976
## 37    90 2.08 23.1 20.0 28.0  6.0 1077
## 38    90 1.93 21.4 11.0 18.0 10.0  746
## 39    90 0.95 10.6 20.0 24.0  6.0 2021
## 40    65 2.38 36.6 16.0 22.0 12.0  739
## 41    95 0.99 10.4 20.0 27.5  8.0 2222
## 42    95 0.85  8.9 19.0 22.0 15.5 2071
## 43    86 2.05 23.8 21.0 28.0 10.0 1093
## 44    82 2.02 24.6 16.0 22.0 14.0  871
## 45    70 1.44 20.6 19.0 26.5 11.0 1472
## 46    92 3.06 33.3 10.0 15.0  6.0  392
## 47    94 1.31 13.9 26.0 40.0 15.0 2443
## 48    79 1.29 16.3 24.0 31.0 10.0 1922
## 49    67 1.47 21.9 15.0 18.0 16.0  980
## 50    75 1.21 16.1 19.0 24.0  4.0 1587
## 51    80 2.41 30.9 19.0 24.0  7.0  797
## 52    61 3.28 54.0 12.0 16.0  7.0  390
## 53   110 1.24 11.3 22.0 27.5 11.0 1774
## 54   116 1.85 15.9 33.0 42.0 13.0 1816
## 55    75 2.00 26.7 16.0 22.0  5.0  880
## 56    92 1.97 21.4 18.0 27.0  3.0 1096
## 57   110 0.96  8.8 15.0 19.0 16.0 1583
## 58    95 2.56 26.9  8.0 13.0  3.0  406
## 59    75 2.32 30.9  8.0 10.0  6.0  345
## 60    80 2.65 33.1 13.0 19.0  9.0  574
## 61   102 1.60 15.7 24.0 31.0 16.0 1550
## 62    86 1.67 19.4 18.0 23.0  8.5 1102
## 63    60 0.82 13.7 22.0 32.0 13.0 3122
## 64   100 1.76 17.6 23.0 33.0  2.0 1500
## 65    80 3.28 41.0 12.0 17.0  2.0  415
## 66   108 2.96 27.4 24.0 35.0  6.5  946
## 67    92 1.37 14.8 25.0 46.0 11.0 2686
## 68   100 1.38 13.8 20.0 31.0 11.0 1797
## 69    80 2.85 35.6 25.0 32.0  7.0  898
## 70    87 2.51 28.8 16.0 24.0 20.0  765
## 71   100 2.31 23.1  8.0 12.0  1.0  416
## 72   120 1.18  9.9 25.0 36.0  8.0 2441
## 73   115 1.83 15.9 25.0 30.0  8.0 1311
## 74   101 2.55 25.2 23.2 30.5  9.0  957
## 75    92 2.17 23.5 19.0 24.0  3.0  885
```

```
## 76     87  1.42  16.1  20.0  26.0  10.0  1465
## 77     80  1.59  19.9  13.0  20.5   4.0  1031
## 78     88  1.47  16.7  23.0  32.5  10.0  1769
## 79    104  1.23  11.8  27.0  33.0  11.0  2146
## 80     90  1.45  16.1  17.0  24.0   8.5  1324
## 81     67  0.85  12.7  26.0  33.0  11.0  3106
## 82     87  2.37  27.2  15.0  22.0  10.0   743
## 83    108  2.40  22.2  26.0  31.0   4.0  1033
## 84    120  1.91  15.9  18.0  27.0  15.0  1131
## 85    108  1.50  13.9  28.0  43.0  16.0  1813
## 86     86  2.36  27.4  24.0  34.0   8.0  1153
## 87    112  1.56  13.9  24.0  29.0   4.0  1487
## 88     80  1.34  17.0  16.0  25.0  16.0  1493
## 89     95  1.65  17.4  20.0  33.0   7.0  1600
## 90     90  2.04  22.7  28.0  41.0  10.0  1608
## 91     90  3.03  33.6  17.0  23.5   7.0   620
## 92     94  1.21  12.9  17.0  22.0   3.0  1455
## 93     51  1.34  26.3  11.0  17.0   6.0  1015
## 94    110  1.17  10.6  29.0  35.0  10.5  2393
## 95     96  1.74  18.1  24.0  29.0   6.0  1333
## 96    132  1.31   9.9  23.0  28.0  12.0  1710
## 97    135  0.95   7.0  15.0  20.0   7.0  1684
## 98    105  1.92  18.3  18.0  24.0   3.0  1000
## 99     99  0.83   8.4  23.0  27.0   8.0  2602
## 100   116  0.60   5.2  33.0  38.0  10.0  5067
## 101   112  1.54  13.8  25.0  31.0   8.0  1610
```

```r
library(FactoMineR)
```

```r
res <- PCA(Xquanti)
```


PCA graph of individuals
Dim 2 (17.51%)
Dim 1 (54.09%)
2
0
−2
−4
0
4



2. Utiliser les qualitatives

```
X <- df[,-1]
X[, 1] <- as.character(X[, 1])
X
```

```
##     C  PRONO FRCAR INCAR INSYS PRDIA PAPUL PVENT REPUL
## 1   2 SURVIE    90  1.71  19.0  16.0  19.5  16.0   912
## 2   1  DECES    90  1.68  18.7  24.0  31.0  14.0  1476
## 3   1  DECES   120  1.40  11.7  23.0  29.0   8.0  1657
## 4   2 SURVIE    82  1.79  21.8  14.0  17.5  10.0   782
## 5   1  DECES    80  1.58  19.7  21.0  28.0  18.5  1418
## 6   1  DECES    80  1.13  14.1  18.0  23.5   9.0  1664
## 7   2 SURVIE    94  2.04  21.7  23.0  27.0  10.0  1059
## 8   2 SURVIE    80  1.19  14.9  16.0  21.0  16.5  1412
## 9   2 SURVIE    78  2.16  27.7  15.0  20.5  11.5   759
## 10  2 SURVIE   100  2.28  22.8  16.0  23.0   4.0   807
## 11  2 SURVIE    90  2.79  31.0  16.0  25.0   8.0   717
## 12  2 SURVIE    86  2.70  31.4  15.0  23.0   9.5   681
## 13  2 SURVIE    80  2.61  32.6   8.0  15.0   1.0   460
## 14  2 SURVIE    61  2.84  47.3  11.0  17.0  12.0   479
## 15  2 SURVIE    99  3.12  31.8  15.0  20.0  11.0   513
## 16  2 SURVIE    92  2.47  26.8  12.0  19.0  11.0   615
## 17  2 SURVIE    96  1.88  19.6  12.0  19.0   3.0   809
```

```
## 18  2 SURVIE   86  1.70  19.8  10.0  14.0  10.5   659
## 19  2 SURVIE  125  3.37  26.9  18.0  28.0   6.0   665
## 20  2 SURVIE   80  2.01  25.0  15.0  20.0   6.0   796
## 21  2 SURVIE   82  3.15  38.4  13.0  20.0   6.0   508
## 22  1  DECES  110  1.66  15.1  23.0  31.0   6.5  1494
## 23  1  DECES   80  1.50  18.7  13.0  17.0  12.0   907
## 24  1  DECES  118  1.03   8.7  19.0  27.0  10.0  2097
## 25  1  DECES   95  1.89  19.9  25.0  27.0  20.0  1143
## 26  1  DECES   80  1.45  18.1  19.0  23.0  15.0  1269
## 27  1  DECES   85  1.30  15.1  13.0  18.0  10.0  1108
## 28  1  DECES  105  1.84  17.5  18.0  22.0  10.0   957
## 29  2 SURVIE  122  2.79  22.9  25.0  36.0  10.0  1032
## 30  2 SURVIE   81  1.77  21.9  18.0  27.0  11.0  1220
## 31  2 SURVIE  118  2.31  19.6  22.0  27.0  10.0   935
## 32  1  DECES   87  1.20  13.8  34.0  41.0  20.0  2733
## 33  1  DECES   65  1.19  18.3  15.0  18.0  13.0  1210
## 34  2 SURVIE   84  2.15  25.6  27.0  37.0  10.0  1377
## 35  1  DECES  103  0.91   8.8  30.0  33.5  10.0  2945
## 36  2 SURVIE   75  2.54  33.9  24.0  31.0  16.0   976
## 37  2 SURVIE   90  2.08  23.1  20.0  28.0   6.0  1077
## 38  2 SURVIE   90  1.93  21.4  11.0  18.0  10.0   746
## 39  1  DECES   90  0.95  10.6  20.0  24.0   6.0  2021
## 40  2 SURVIE   65  2.38  36.6  16.0  22.0  12.0   739
## 41  1  DECES   95  0.99  10.4  20.0  27.5   8.0  2222
## 42  1  DECES   95  0.85   8.9  19.0  22.0  15.5  2071
## 43  2 SURVIE   86  2.05  23.8  21.0  28.0  10.0  1093
## 44  2 SURVIE   82  2.02  24.6  16.0  22.0  14.0   871
## 45  1  DECES   70  1.44  20.6  19.0  26.5  11.0  1472
## 46  2 SURVIE   92  3.06  33.3  10.0  15.0   6.0   392
## 47  1  DECES   94  1.31  13.9  26.0  40.0  15.0  2443
## 48  1  DECES   79  1.29  16.3  24.0  31.0  10.0  1922
## 49  2 SURVIE   67  1.47  21.9  15.0  18.0  16.0   980
## 50  1  DECES   75  1.21  16.1  19.0  24.0   4.0  1587
## 51  2 SURVIE   80  2.41  30.9  19.0  24.0   7.0   797
## 52  2 SURVIE   61  3.28  54.0  12.0  16.0   7.0   390
## 53  1  DECES  110  1.24  11.3  22.0  27.5  11.0  1774
## 54  1  DECES  116  1.85  15.9  33.0  42.0  13.0  1816
## 55  2 SURVIE   75  2.00  26.7  16.0  22.0   5.0   880
## 56  1  DECES   92  1.97  21.4  18.0  27.0   3.0  1096
## 57  2 SURVIE  110  0.96   8.8  15.0  19.0  16.0  1583
## 58  2 SURVIE   95  2.56  26.9   8.0  13.0   3.0   406
## 59  2 SURVIE   75  2.32  30.9   8.0  10.0   6.0   345
## 60  2 SURVIE   80  2.65  33.1  13.0  19.0   9.0   574
## 61  1  DECES  102  1.60  15.7  24.0  31.0  16.0  1550
## 62  2 SURVIE   86  1.67  19.4  18.0  23.0   8.5  1102
## 63  1  DECES   60  0.82  13.7  22.0  32.0  13.0  3122
## 64  2 SURVIE  100  1.76  17.6  23.0  33.0   2.0  1500
## 65  2 SURVIE   80  3.28  41.0  12.0  17.0   2.0   415
## 66  2 SURVIE  108  2.96  27.4  24.0  35.0   6.5   946
## 67  1  DECES   92  1.37  14.8  25.0  46.0  11.0  2686
## 68  1  DECES  100  1.38  13.8  20.0  31.0  11.0  1797
## 69  2 SURVIE   80  2.85  35.6  25.0  32.0   7.0   898
## 70  1  DECES   87  2.51  28.8  16.0  24.0  20.0   765
## 71  2 SURVIE  100  2.31  23.1   8.0  12.0   1.0   416
```

```
## 72   1  DECES   120  1.18   9.9  25.0  36.0   8.0  2441
## 73   1  DECES   115  1.83  15.9  25.0  30.0   8.0  1311
## 74   2 SURVIE   101  2.55  25.2  23.2  30.5   9.0   957
## 75   2 SURVIE    92  2.17  23.5  19.0  24.0   3.0   885
## 76   1  DECES    87  1.42  16.1  20.0  26.0  10.0  1465
## 77   2 SURVIE    80  1.59  19.9  13.0  20.5   4.0  1031
## 78   1  DECES    88  1.47  16.7  23.0  32.5  10.0  1769
## 79   1  DECES   104  1.23  11.8  27.0  33.0  11.0  2146
## 80   2 SURVIE    90  1.45  16.1  17.0  24.0   8.5  1324
## 81   1  DECES    67  0.85  12.7  26.0  33.0  11.0  3106
## 82   2 SURVIE    87  2.37  27.2  15.0  22.0  10.0   743
## 83   2 SURVIE   108  2.40  22.2  26.0  31.0   4.0  1033
## 84   1  DECES   120  1.91  15.9  18.0  27.0  15.0  1131
## 85   1  DECES   108  1.50  13.9  28.0  43.0  16.0  1813
## 86   2 SURVIE    86  2.36  27.4  24.0  34.0   8.0  1153
## 87   1  DECES   112  1.56  13.9  24.0  29.0   4.0  1487
## 88   1  DECES    80  1.34  17.0  16.0  25.0  16.0  1493
## 89   1  DECES    95  1.65  17.4  20.0  33.0   7.0  1600
## 90   1  DECES    90  2.04  22.7  28.0  41.0  10.0  1608
## 91   2 SURVIE    90  3.03  33.6  17.0  23.5   7.0   620
## 92   1  DECES    94  1.21  12.9  17.0  22.0   3.0  1455
## 93   1  DECES    51  1.34  26.3  11.0  17.0   6.0  1015
## 94   1  DECES   110  1.17  10.6  29.0  35.0  10.5  2393
## 95   1  DECES    96  1.74  18.1  24.0  29.0   6.0  1333
## 96   1  DECES   132  1.31   9.9  23.0  28.0  12.0  1710
## 97   1  DECES   135  0.95   7.0  15.0  20.0   7.0  1684
## 98   1  DECES   105  1.92  18.3  18.0  24.0   3.0  1000
## 99   1  DECES    99  0.83   8.4  23.0  27.0   8.0  2602
## 100  1  DECES   116  0.60   5.2  33.0  38.0  10.0  5067
## 101  1  DECES   112  1.54  13.8  25.0  31.0   8.0  1610
```

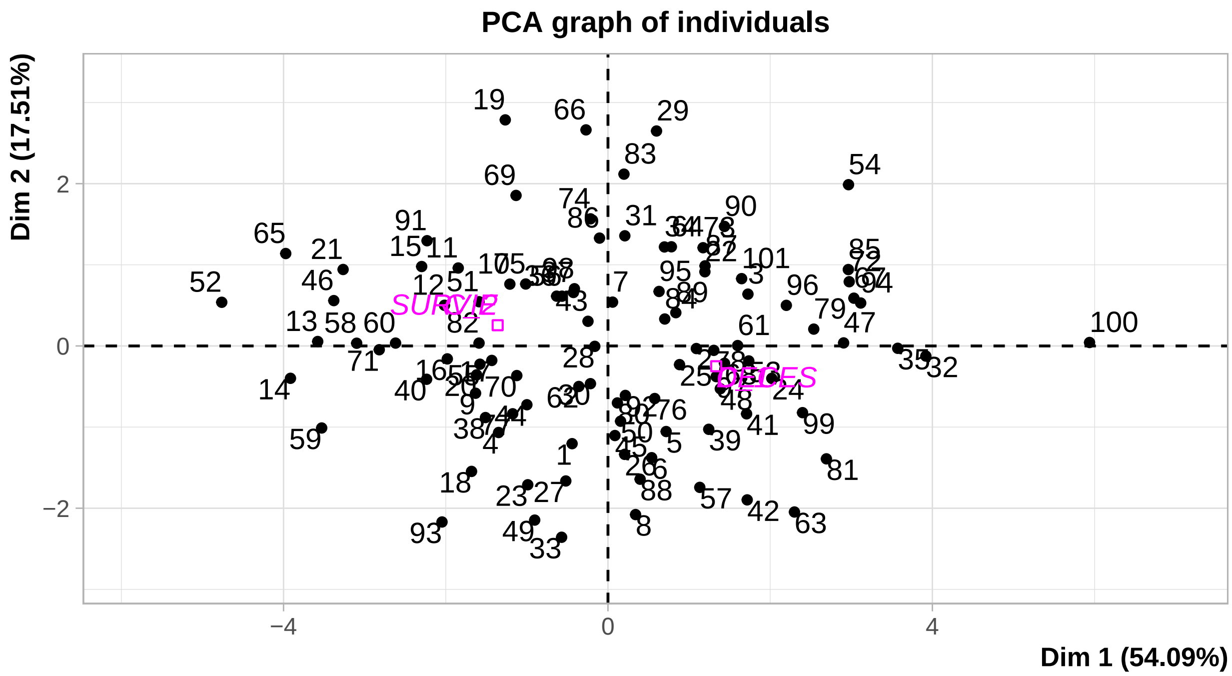
```r
quali_indice <- c(1,2)
X[,quali_indice]
```

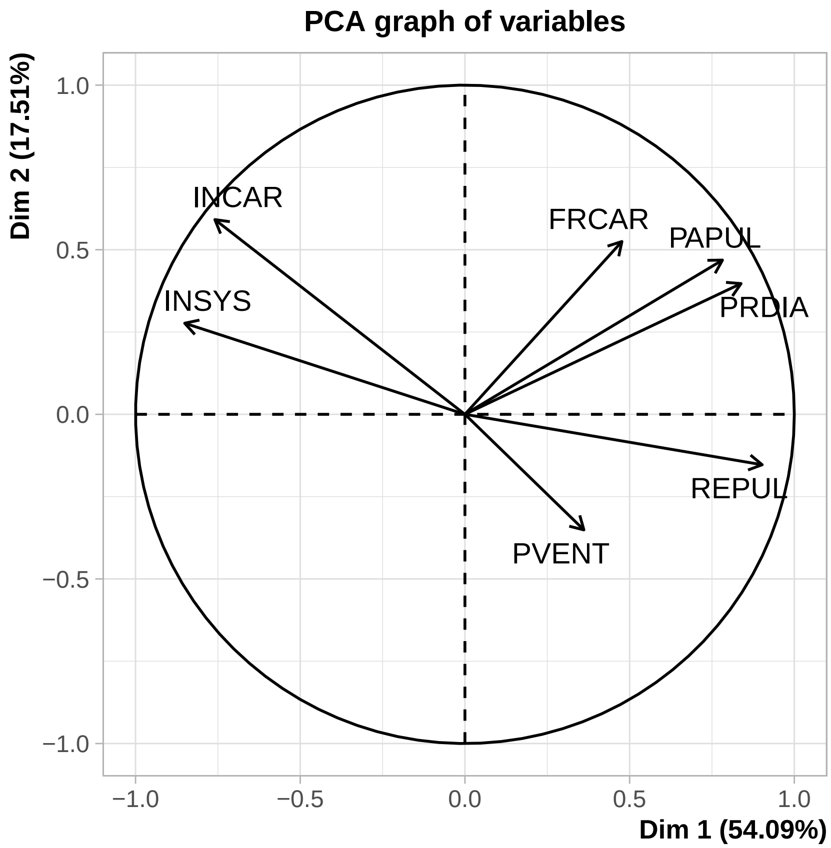
```
##     C  PRONO
## 1   2 SURVIE
## 2   1  DECES
## 3   1  DECES
## 4   2 SURVIE
## 5   1  DECES
## 6   1  DECES
## 7   2 SURVIE
## 8   2 SURVIE
## 9   2 SURVIE
## 10  2 SURVIE
## 11  2 SURVIE
## 12  2 SURVIE
## 13  2 SURVIE
## 14  2 SURVIE
## 15  2 SURVIE
## 16  2 SURVIE
## 17  2 SURVIE
## 18  2 SURVIE
## 19  2 SURVIE
```

```
## 20  2 SURVIE
## 21  2 SURVIE
## 22  1  DECES
## 23  1  DECES
## 24  1  DECES
## 25  1  DECES
## 26  1  DECES
## 27  1  DECES
## 28  1  DECES
## 29  2 SURVIE
## 30  2 SURVIE
## 31  2 SURVIE
## 32  1  DECES
## 33  1  DECES
## 34  2 SURVIE
## 35  1  DECES
## 36  2 SURVIE
## 37  2 SURVIE
## 38  2 SURVIE
## 39  1  DECES
## 40  2 SURVIE
## 41  1  DECES
## 42  1  DECES
## 43  2 SURVIE
## 44  2 SURVIE
## 45  1  DECES
## 46  2 SURVIE
## 47  1  DECES
## 48  1  DECES
## 49  2 SURVIE
## 50  1  DECES
## 51  2 SURVIE
## 52  2 SURVIE
## 53  1  DECES
## 54  1  DECES
## 55  2 SURVIE
## 56  1  DECES
## 57  2 SURVIE
## 58  2 SURVIE
## 59  2 SURVIE
## 60  2 SURVIE
## 61  1  DECES
## 62  2 SURVIE
## 63  1  DECES
## 64  2 SURVIE
## 65  2 SURVIE
## 66  2 SURVIE
## 67  1  DECES
## 68  1  DECES
## 69  2 SURVIE
## 70  1  DECES
## 71  2 SURVIE
## 72  1  DECES
## 73  1  DECES
```

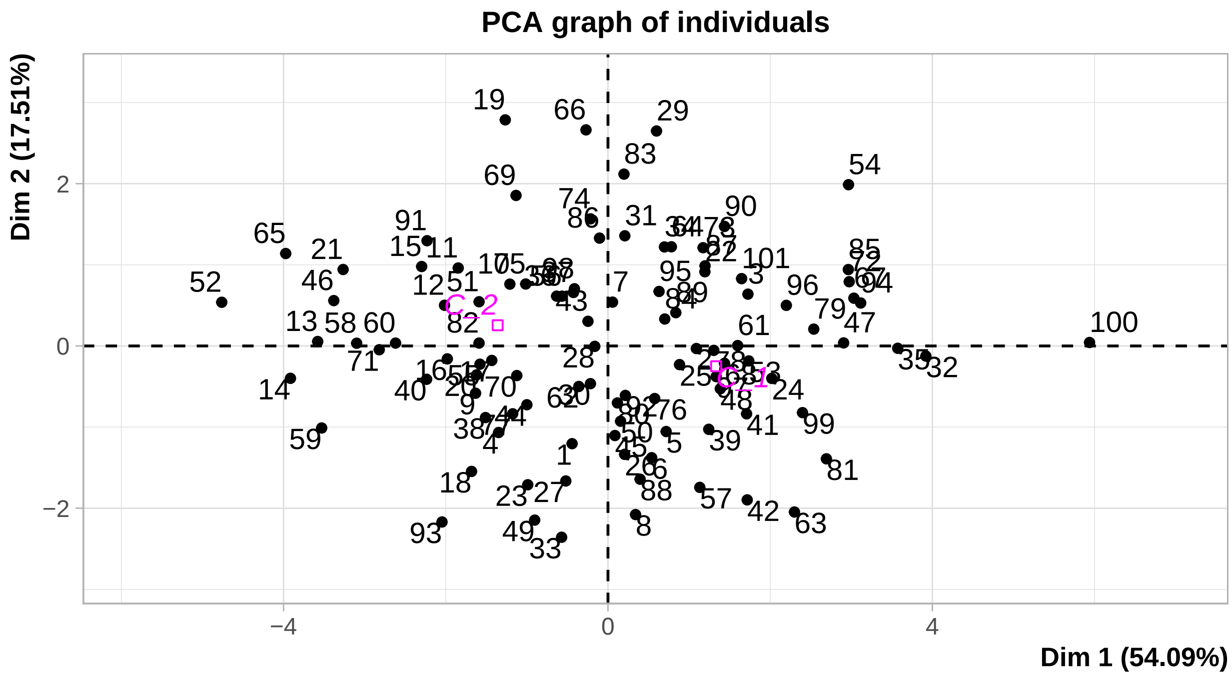
```
## 74   2 SURVIE
## 75   2 SURVIE
## 76   1  DECES
## 77   2 SURVIE
## 78   1  DECES
## 79   1  DECES
## 80   2 SURVIE
## 81   1  DECES
## 82   2 SURVIE
## 83   2 SURVIE
## 84   1  DECES
## 85   1  DECES
## 86   2 SURVIE
## 87   1  DECES
## 88   1  DECES
## 89   1  DECES
## 90   1  DECES
## 91   2 SURVIE
## 92   1  DECES
## 93   1  DECES
## 94   1  DECES
## 95   1  DECES
## 96   1  DECES
## 97   1  DECES
## 98   1  DECES
## 99   1  DECES
## 100 1  DECES
## 101 1  DECES
```

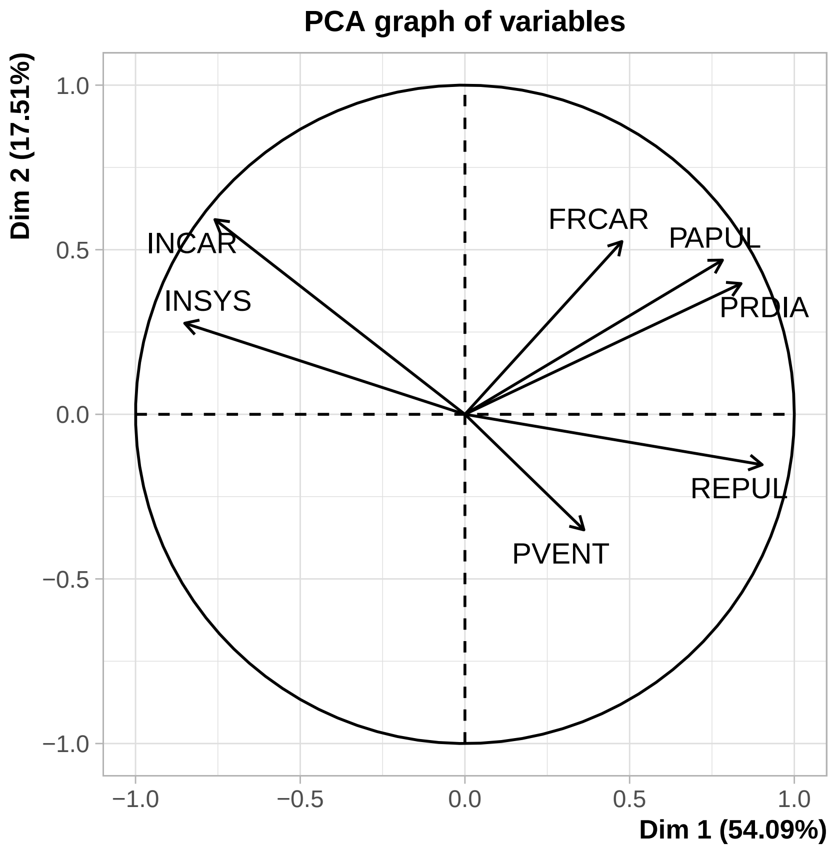
```r
res_all <- PCA(
  X,
  quali.sup = quali_indice
)
```


PCA graph of individuals
Dim 2 (17.51%)
Dim 1 (54.09%)
SURVIE
DECES




```
res_all_2 <- PCA(
  X[,-c(2)],
  quali.sup = 1
)
```


PCA graph of individuals
Dim 2 (17.51%)
Dim 1 (54.09%)
2
0
−2
−4
0
4




```r
summary(res)
```

```
##
## Call:
## PCA(X = Xquanti)
##
##
## Eigenvalues
##                        Dim.1   Dim.2   Dim.3   Dim.4   Dim.5   Dim.6   Dim.7
## Variance               3.787   1.226   1.093   0.658   0.148   0.068   0.021
## % of var.             54.094  17.514  15.615   9.403   2.112   0.966   0.296
## Cumulative % of var.  54.094  71.607  87.223  96.626  98.738  99.704 100.000
##
## Individuals (the 10 first)
##             Dist    Dim.1    ctr   cos2    Dim.2    ctr   cos2    Dim.3    ctr
## 1      |  1.948 | -0.442  0.051  0.052 | -1.205  1.172  0.382 |  0.484  0.212
## 2      |  1.553 |  1.090  0.311  0.493 | -0.032  0.001  0.000 |  1.027  0.956
## 3      |  2.314 |  1.726  0.779  0.556 |  0.638  0.329  0.076 | -1.268  1.456
## 4      |  1.774 | -1.348  0.475  0.577 | -1.067  0.919  0.362 | -0.213  0.041
## 5      |  2.293 |  0.717  0.135  0.098 | -1.055  0.899  0.212 |  1.737  2.732
## 6      |  1.650 |  0.539  0.076  0.107 | -1.378  1.532  0.697 | -0.396  0.142
## 7      |  0.831 |  0.057  0.001  0.005 |  0.540  0.236  0.422 |  0.336  0.102
## 8      |  2.332 |  0.340  0.030  0.021 | -2.078  3.489  0.794 |  0.578  0.302
## 9      |  1.874 | -1.632  0.697  0.759 | -0.583  0.274  0.097 |  0.673  0.410
## 10     |  1.822 | -1.210  0.383  0.441 |  0.762  0.469  0.175 | -1.113  1.123
```

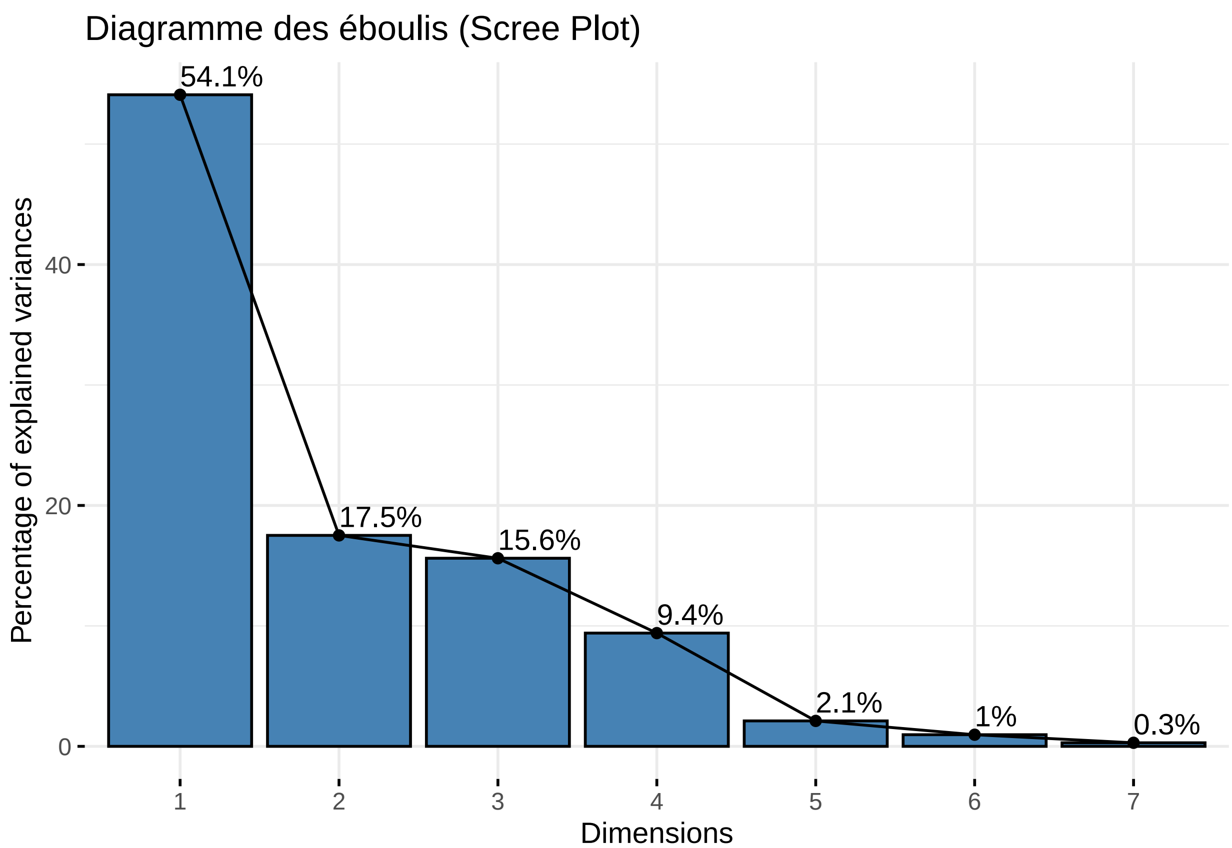
```
##         cos2
## 1      0.062 |
## 2      0.438 |
## 3      0.300 |
## 4      0.014 |
## 5      0.574 |
## 6      0.058 |
## 7      0.163 |
## 8      0.061 |
## 9      0.129 |
## 10     0.373 |
##
## Variables
##          Dim.1    ctr   cos2    Dim.2    ctr   cos2    Dim.3    ctr   cos2
## FRCAR |  0.477  6.001  0.227 |  0.525 22.475  0.276 | -0.500 22.897  0.250 |
## INCAR | -0.759 15.217  0.576 |  0.592 28.542  0.350 |  0.219  4.369  0.048 |
## INSYS | -0.851 19.117  0.724 |  0.277  6.246  0.077 |  0.394 14.197  0.155 |
## PRDIA |  0.838 18.558  0.703 |  0.397 12.866  0.158 |  0.284  7.377  0.081 |
## PAPUL |  0.782 16.148  0.611 |  0.469 17.904  0.219 |  0.320  9.377  0.102 |
## PVENT |  0.361  3.446  0.130 | -0.351 10.054  0.123 |  0.676 41.778  0.457 |
## REPUL |  0.903 21.513  0.815 | -0.153  1.913  0.023 |  0.008  0.006  0.000 |
```

```r
library(factoextra)
```

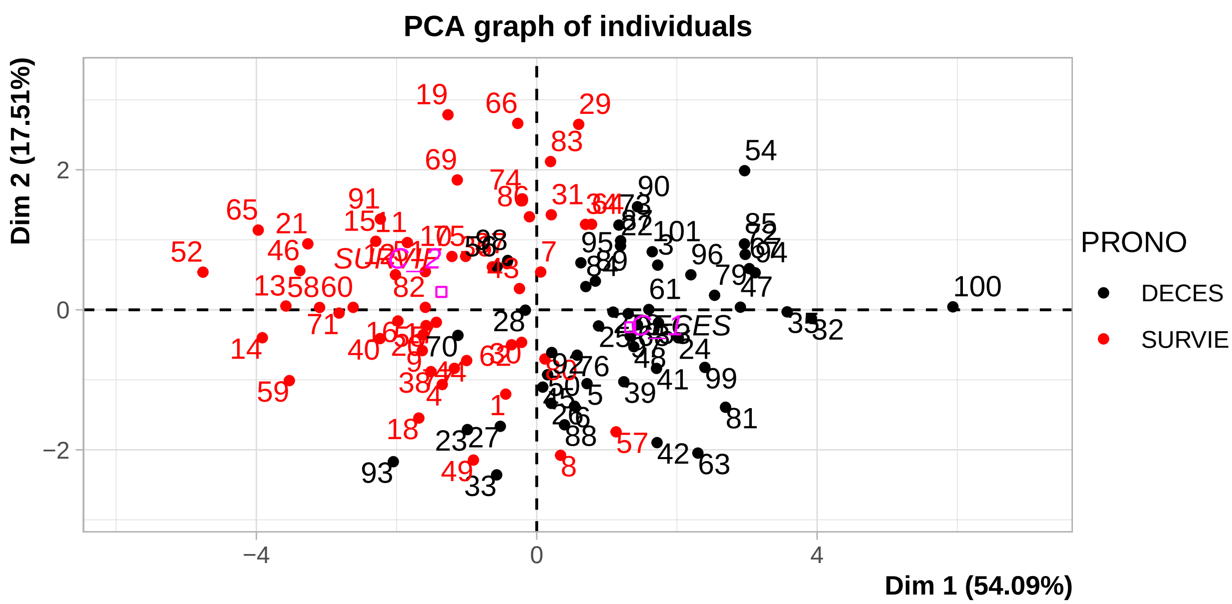
```
## Le chargement a nécessité le package : ggplot2
```

```
## Welcome! Want to learn more? See two factoextra-related books at https://goo.gl/ve3WBa
```

```r
fviz_eig(res, addlabels = TRUE, barfill = "steelblue", barcolor = "black") +
  ggtitle("Diagramme des éboulis (Scree Plot)")
```




```
plot(res_all, habillage=2)
```



3. Interprétation (10 lignes minimum). Quelles sont les variables liées au pronostic ?

La dimension 1 et 2 represente 71.6% de variance expliqué à eux deux.

Les variables qui joue un role important sur le dignostiques sont les varibale les mieux progetés sur le plan.

Voici la liste des variables liées au pronostic :

- INCAR
- INSYS
- PAPUL
- PRDIA
- RPUL

Le nuage de point semble assez dispersé sur l'axe vertical. Et etalé sur l'axe horizontal avec une perte de densité sur les extrémité.

Les observations comprenant un décés et C=1 ont tendance a etre positif dans la premieres dimension tandis que ce qui comprenent une survie et C=2 sont négatif sur la première dimension. La deuxieme dimension parrait uniform donc sans conclusion.

En conclusion, les décés semble etre lié à un score positif sur les variable qui contribuent positivement à la premiere dimension (e.i. PAPUL, PRDIA, RPUL). Les varibles contribuant le plus negativement à la premiere dimension sont plutot lié à la survie (i.e. INCAR, INSYS). Les personnes avec l'attribue C_1 ont plus de risque de décéder tandis que les personne avec l'attribut C_2 ont plus de probabilité de survie.