Part II: Generalized Linear Models

Load Packages

Again, we must load the packages that will be used in the first part of this workshop.

```
library(pastecs, quietly = TRUE)
library(lm.beta,  quietly = TRUE)
library(lmtest,  quietly = TRUE)
library(foreign,  quietly = TRUE)
library(lattice,  quietly = TRUE)
library(lme4,  quietly = TRUE)
library(nlme,  quietly = TRUE)
library(survival,  quietly = TRUE)
library(dplyr,  quietly = TRUE)
library(ggfortify,  quietly = TRUE)
library(survminer,  quietly = TRUE)
library(rms,  quietly = TRUE)
library(MASS, quietly = TRUE)
```

```
attach(colon)
head(colon)
```

```
##   id study      rx sex age obstruct perfor adhere nodes status differ
## 1  1     1 Lev+5FU   1  43        0      0      0     5      1      2
## 2  1     1 Lev+5FU   1  43        0      0      0     5      1      2
## 3  2     1 Lev+5FU   1  63        0      0      0     1      0      2
## 4  2     1 Lev+5FU   1  63        0      0      0     1      0      2
## 5  3     1     Obs   0  71        0      0      1     7      1      2
## 6  3     1     Obs   0  71        0      0      1     7      1      2
##   extent surg node4 time etype
## 1      3    0     1 1521     2
## 2      3    0     1  968     1
## 3      3    0     0 3087     2
## 4      3    0     0 3087     1
## 5      2    0     1  963     2
## 6      2    0     1  542     1
```

```
sapply(colon,class)
```

```
##        id     study        rx       sex       age  obstruct    perfor
## "numeric" "numeric"  "factor" "numeric" "numeric" "numeric" "numeric"
##    adhere     nodes    status    differ    extent      surg     node4
## "numeric" "numeric" "numeric" "numeric" "numeric" "numeric" "numeric"
##      time     etype
## "numeric" "numeric"
```

Dichotomize age and nodes. Change data labels to factors

```
colon_subset_recurrence = colon[colon$etype==1,]
colon_subset_recurrence$age.ds = sapply(colon_subset_recurrence$age, function(x) ifelse(x > 60, 1, 0))
colon_subset_recurrence$age.ds <- factor(colon_subset_recurrence$age.ds, levels= c("0","1"), labels=c("
```

```r
colon_subset_recurrence$nodes.ds = sapply(colon_subset_recurrence$nodes, function(x) ifelse(x > 3, 1, 0)
colon_subset_recurrence$nodes.ds <- factor(colon_subset_recurrence$nodes.ds, levels= c("0","1"), labels=

colon_subset_recurrence$sex <- factor(colon_subset_recurrence$sex, levels= c("0","1"), labels=c("F","M"
colon_subset_recurrence$obstruct <- factor(colon_subset_recurrence$obstruct,levels= c("0","1"), labels=c
colon_subset_recurrence$adhere <- factor(colon_subset_recurrence$adhere,levels= c("0","1"), labels=c("no

colon_subset_recurrence$perfor <- factor(colon_subset_recurrence$perfor, levels= c("0","1"), labels=c("n
colon_subset_recurrence$differ <- factor(colon_subset_recurrence$differ, levels= c("1","2","3"), labels=
colon_subset_recurrence$extent <- factor(colon_subset_recurrence$extent,  levels= c("1","2","3","4"),
                                         labels=c("submucosa", "muscle", "serosa", "contiguous"))
colon_subset_recurrence$surg <- factor(colon_subset_recurrence$surg,levels= c("0","1"),
                                       labels=c("short","long"))
head(colon_subset_recurrence)
```

```
##    id study      rx sex age    obstruct    perfor    adhere nodes status
## 2   1     1 Lev+5FU   M  43 no obstruct no perfor no adhere     5      1
## 4   2     1 Lev+5FU   M  63 no obstruct no perfor no adhere     1      0
## 6   3     1     Obs   F  71 no obstruct no perfor    adhere     7      1
## 8   4     1 Lev+5FU   F  66    obstruct no perfor no adhere     6      1
## 10  5     1     Obs   M  69 no obstruct no perfor no adhere    22      1
## 12  6     1 Lev+5FU   F  57 no obstruct no perfor no adhere     9      1
##    differ extent  surg node4 time etype age.ds nodes.ds
## 2     mod serosa short     1  968     1    <60       >3
## 4     mod serosa short     0 3087     1    >60       <3
## 6     mod muscle short     1  542     1    >60       >3
## 8     mod serosa  long     1  245     1    >60       >3
## 10    mod serosa  long     1  523     1    >60       >3
## 12    mod serosa short     1  904     1    <60       >3
```

```r
surv <-with(colon_subset_recurrence, Surv(time,status))
```

Kalpan-Meier

```r
km_fit <- survfit(surv~1, data=colon_subset_recurrence)
summary(km_fit)
```

```
## Call: survfit(formula = surv ~ 1, data = colon_subset_recurrence)
##
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##     8    929       1    0.999 0.00108        0.997        1.000
##     9    928       1    0.998 0.00152        0.995        1.000
##    19    927       1    0.997 0.00186        0.993        1.000
##    20    926       1    0.996 0.00215        0.991        1.000
##    28    923       1    0.995 0.00240        0.990        0.999
##    35    922       1    0.994 0.00263        0.988        0.999
##    36    921       1    0.992 0.00284        0.987        0.998
##    38    920       1    0.991 0.00303        0.985        0.997
##    40    919       1    0.990 0.00322        0.984        0.997
##    43    918       1    0.989 0.00339        0.983        0.996
##    45    917       1    0.988 0.00355        0.981        0.995
##    49    915       1    0.987 0.00371        0.980        0.994
```

```
##    59    913       1    0.986 0.00386        0.978        0.994
##    62    912       2    0.984 0.00414        0.976        0.992
##    63    910       1    0.983 0.00428        0.974        0.991
##    68    909       1    0.982 0.00441        0.973        0.990
##    72    908       2    0.979 0.00466        0.970        0.989
##    77    906       2    0.977 0.00489        0.968        0.987
##    78    904       1    0.976 0.00500        0.966        0.986
##    79    903       1    0.975 0.00511        0.965        0.985
##    80    902       3    0.972 0.00543        0.961        0.983
##    85    899       2    0.970 0.00563        0.959        0.981
##    86    897       2    0.968 0.00582        0.956        0.979
##    88    895       1    0.967 0.00591        0.955        0.978
##    91    894       2    0.964 0.00609        0.952        0.976
##    94    892       1    0.963 0.00618        0.951        0.975
##    98    891       3    0.960 0.00644        0.947        0.973
##    99    888       2    0.958 0.00660        0.945        0.971
##   100    886       1    0.957 0.00668        0.944        0.970
##   101    885       2    0.955 0.00684        0.941        0.968
##   102    883       1    0.954 0.00692        0.940        0.967
##   103    882       1    0.952 0.00699        0.939        0.966
##   105    881       1    0.951 0.00707        0.938        0.965
##   106    880       1    0.950 0.00714        0.936        0.964
##   108    879       1    0.949 0.00722        0.935        0.963
##   109    878       1    0.948 0.00729        0.934        0.963
##   111    877       1    0.947 0.00736        0.933        0.962
##   113    876       3    0.944 0.00757        0.929        0.959
##   116    873       3    0.941 0.00777        0.925        0.956
##   118    870       1    0.939 0.00784        0.924        0.955
##   119    869       1    0.938 0.00790        0.923        0.954
##   121    868       2    0.936 0.00803        0.921        0.952
##   122    866       1    0.935 0.00809        0.919        0.951
##   127    865       1    0.934 0.00816        0.918        0.950
##   131    864       1    0.933 0.00822        0.917        0.949
##   132    863       1    0.932 0.00828        0.916        0.948
##   134    862       1    0.931 0.00834        0.915        0.947
##   136    861       1    0.930 0.00840        0.913        0.946
##   139    860       1    0.929 0.00846        0.912        0.945
##   141    859       1    0.928 0.00852        0.911        0.944
##   143    858       1    0.927 0.00858        0.910        0.943
##   145    857       1    0.925 0.00864        0.909        0.943
##   146    856       2    0.923 0.00875        0.906        0.941
##   147    854       1    0.922 0.00881        0.905        0.940
##   154    853       2    0.920 0.00892        0.903        0.938
##   157    851       3    0.917 0.00908        0.899        0.935
##   160    848       1    0.916 0.00913        0.898        0.934
##   161    847       2    0.914 0.00924        0.896        0.932
##   165    845       3    0.910 0.00939        0.892        0.929
##   166    842       1    0.909 0.00944        0.891        0.928
##   167    841       1    0.908 0.00950        0.890        0.927
##   168    840       1    0.907 0.00955        0.889        0.926
##   169    839       1    0.906 0.00959        0.887        0.925
##   173    838       3    0.903 0.00974        0.884        0.922
##   174    835       3    0.899 0.00988        0.880        0.919
##   175    832       1    0.898 0.00993        0.879        0.918
```

```
##   176   831       2   0.896 0.01002        0.877        0.916
##   179   829       1   0.895 0.01007        0.876        0.915
##   181   828       1   0.894 0.01012        0.874        0.914
##   183   827       2   0.892 0.01021        0.872        0.912
##   185   825       5   0.887 0.01043        0.866        0.907
##   186   820       1   0.885 0.01047        0.865        0.906
##   188   819       1   0.884 0.01051        0.864        0.905
##   189   818       2   0.882 0.01060        0.862        0.903
##   191   816       2   0.880 0.01068        0.859        0.901
##   196   814       1   0.879 0.01072        0.858        0.900
##   198   813       1   0.878 0.01076        0.857        0.899
##   199   812       1   0.877 0.01081        0.856        0.898
##   201   811       1   0.876 0.01085        0.855        0.897
##   203   810       1   0.875 0.01089        0.854        0.896
##   204   809       1   0.874 0.01093        0.852        0.895
##   205   808       1   0.872 0.01097        0.851        0.894
##   208   807       2   0.870 0.01105        0.849        0.892
##   215   805       2   0.868 0.01112        0.847        0.890
##   216   803       1   0.867 0.01116        0.845        0.889
##   218   802       3   0.864 0.01128        0.842        0.886
##   219   799       1   0.863 0.01131        0.841        0.885
##   221   797       1   0.862 0.01135        0.840        0.884
##   223   796       1   0.861 0.01139        0.839        0.883
##   224   795       1   0.859 0.01143        0.837        0.882
##   227   794       1   0.858 0.01146        0.836        0.881
##   228   793       1   0.857 0.01150        0.835        0.880
##   229   792       2   0.855 0.01157        0.833        0.878
##   230   790       5   0.850 0.01175        0.827        0.873
##   235   785       1   0.849 0.01178        0.826        0.872
##   237   784       2   0.846 0.01185        0.824        0.870
##   238   782       2   0.844 0.01192        0.821        0.868
##   242   780       1   0.843 0.01195        0.820        0.867
##   243   779       1   0.842 0.01199        0.819        0.866
##   245   778       2   0.840 0.01205        0.817        0.864
##   246   776       1   0.839 0.01209        0.816        0.863
##   248   775       1   0.838 0.01212        0.814        0.862
##   250   774       1   0.837 0.01215        0.813        0.861
##   252   773       1   0.836 0.01218        0.812        0.860
##   253   772       1   0.835 0.01222        0.811        0.859
##   255   771       1   0.834 0.01225        0.810        0.858
##   256   770       2   0.831 0.01231        0.808        0.856
##   257   768       1   0.830 0.01234        0.806        0.855
##   258   767       1   0.829 0.01238        0.805        0.854
##   260   766       2   0.827 0.01244        0.803        0.852
##   261   764       1   0.826 0.01247        0.802        0.851
##   262   763       1   0.825 0.01250        0.801        0.850
##   263   762       2   0.823 0.01256        0.798        0.848
##   264   760       1   0.822 0.01259        0.797        0.847
##   271   759       2   0.819 0.01265        0.795        0.845
##   273   757       1   0.818 0.01268        0.794        0.844
##   274   756       1   0.817 0.01271        0.793        0.843
##   276   755       2   0.815 0.01277        0.790        0.841
##   279   753       3   0.812 0.01285        0.787        0.837
##   280   750       1   0.811 0.01288        0.786        0.836
```

```
##   285   749       1   0.810 0.01291       0.785       0.835
##   286   748       3   0.806 0.01299       0.781       0.832
##   290   745       2   0.804 0.01305       0.779       0.830
##   291   743       1   0.803 0.01307       0.778       0.829
##   294   742       2   0.801 0.01313       0.776       0.827
##   296   740       2   0.799 0.01318       0.773       0.825
##   300   738       1   0.798 0.01321       0.772       0.824
##   303   737       1   0.797 0.01323       0.771       0.823
##   304   736       1   0.796 0.01326       0.770       0.822
##   308   735       1   0.795 0.01329       0.769       0.821
##   313   734       1   0.793 0.01331       0.768       0.820
##   315   733       2   0.791 0.01336       0.766       0.818
##   322   731       2   0.789 0.01342       0.763       0.816
##   325   729       1   0.788 0.01344       0.762       0.815
##   328   727       1   0.787 0.01347       0.761       0.814
##   329   726       1   0.786 0.01349       0.760       0.813
##   330   725       2   0.784 0.01354       0.758       0.811
##   333   723       1   0.783 0.01356       0.756       0.810
##   334   722       1   0.782 0.01359       0.755       0.809
##   335   721       1   0.780 0.01361       0.754       0.808
##   336   720       2   0.778 0.01366       0.752       0.806
##   337   718       3   0.775 0.01373       0.749       0.802
##   341   714       1   0.774 0.01376       0.747       0.801
##   344   713       1   0.773 0.01378       0.746       0.800
##   348   712       2   0.771 0.01383       0.744       0.798
##   349   710       1   0.770 0.01385       0.743       0.797
##   352   709       2   0.767 0.01390       0.741       0.795
##   354   707       1   0.766 0.01392       0.740       0.794
##   356   705       2   0.764 0.01396       0.737       0.792
##   360   703       2   0.762 0.01401       0.735       0.790
##   362   701       1   0.761 0.01403       0.734       0.789
##   365   700       1   0.760 0.01405       0.733       0.788
##   366   699       1   0.759 0.01407       0.732       0.787
##   369   698       1   0.758 0.01410       0.731       0.786
##   370   697       1   0.757 0.01412       0.729       0.785
##   372   696       1   0.755 0.01414       0.728       0.784
##   374   695       1   0.754 0.01416       0.727       0.783
##   378   694       1   0.753 0.01418       0.726       0.782
##   379   693       1   0.752 0.01420       0.725       0.781
##   380   692       2   0.750 0.01424       0.723       0.778
##   382   690       1   0.749 0.01427       0.722       0.777
##   384   689       1   0.748 0.01429       0.720       0.776
##   386   688       2   0.746 0.01433       0.718       0.774
##   389   686       1   0.745 0.01435       0.717       0.773
##   392   685       1   0.744 0.01437       0.716       0.772
##   393   684       1   0.742 0.01439       0.715       0.771
##   398   683       1   0.741 0.01441       0.714       0.770
##   401   682       1   0.740 0.01443       0.713       0.769
##   402   681       1   0.739 0.01445       0.711       0.768
##   405   680       1   0.738 0.01447       0.710       0.767
##   406   679       1   0.737 0.01449       0.709       0.766
##   408   678       1   0.736 0.01451       0.708       0.765
##   411   677       1   0.735 0.01452       0.707       0.764
##   413   676       1   0.734 0.01454       0.706       0.763
```

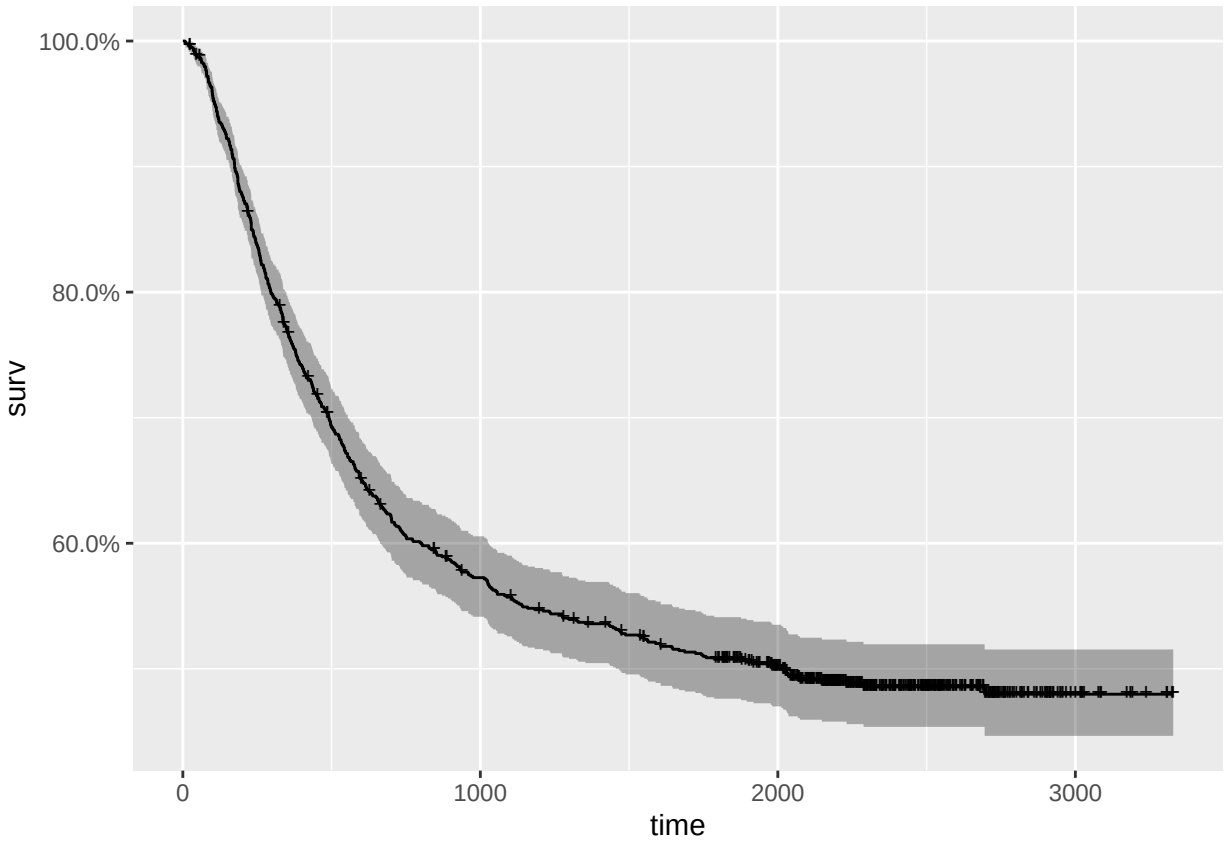
```
##   415   675       2   0.732 0.01458        0.704        0.761
##   422   672       1   0.730 0.01460        0.702        0.760
##   429   671       1   0.729 0.01462        0.701        0.759
##   431   670       1   0.728 0.01464        0.700        0.758
##   433   669       1   0.727 0.01466        0.699        0.757
##   434   668       1   0.726 0.01468        0.698        0.755
##   435   667       1   0.725 0.01469        0.697        0.754
##   437   666       1   0.724 0.01471        0.696        0.753
##   438   665       1   0.723 0.01473        0.695        0.752
##   439   664       1   0.722 0.01475        0.693        0.751
##   440   663       1   0.721 0.01477        0.692        0.750
##   443   662       1   0.720 0.01478        0.691        0.749
##   448   661       1   0.719 0.01480        0.690        0.748
##   449   660       1   0.717 0.01482        0.689        0.747
##   454   658       2   0.715 0.01485        0.687        0.745
##   458   656       2   0.713 0.01489        0.684        0.743
##   461   654       1   0.712 0.01491        0.683        0.742
##   465   653       1   0.711 0.01492        0.682        0.741
##   466   652       2   0.709 0.01496        0.680        0.739
##   474   650       1   0.708 0.01497        0.679        0.738
##   476   649       1   0.707 0.01499        0.678        0.737
##   480   648       1   0.705 0.01501        0.677        0.735
##   482   647       1   0.704 0.01502        0.675        0.734
##   485   646       1   0.703 0.01504        0.674        0.733
##   489   643       1   0.702 0.01505        0.673        0.732
##   490   642       1   0.701 0.01507        0.672        0.731
##   491   641       2   0.699 0.01510        0.670        0.729
##   493   639       1   0.698 0.01512        0.669        0.728
##   495   638       1   0.697 0.01513        0.668        0.727
##   496   637       1   0.696 0.01515        0.667        0.726
##   497   636       1   0.694 0.01517        0.665        0.725
##   498   635       1   0.693 0.01518        0.664        0.724
##   499   634       1   0.692 0.01520        0.663        0.723
##   504   633       1   0.691 0.01521        0.662        0.722
##   505   632       1   0.690 0.01523        0.661        0.721
##   510   631       1   0.689 0.01524        0.660        0.720
##   511   630       1   0.688 0.01526        0.659        0.718
##   513   629       1   0.687 0.01527        0.658        0.717
##   523   628       1   0.686 0.01529        0.656        0.716
##   525   627       1   0.685 0.01530        0.655        0.715
##   526   626       1   0.684 0.01532        0.654        0.714
##   527   625       1   0.682 0.01533        0.653        0.713
##   532   624       2   0.680 0.01536        0.651        0.711
##   534   622       1   0.679 0.01537        0.650        0.710
##   536   621       1   0.678 0.01539        0.649        0.709
##   540   620       1   0.677 0.01540        0.647        0.708
##   542   619       1   0.676 0.01542        0.646        0.707
##   543   618       2   0.674 0.01544        0.644        0.705
##   547   616       1   0.673 0.01546        0.643        0.704
##   548   615       1   0.672 0.01547        0.642        0.703
##   554   614       2   0.669 0.01550        0.640        0.700
##   555   612       1   0.668 0.01551        0.639        0.699
##   560   611       1   0.667 0.01552        0.637        0.698
##   561   610       1   0.666 0.01554        0.636        0.697
```

```
##   565   609       1   0.665 0.01555       0.635       0.696
##   573   608       2   0.663 0.01557       0.633       0.694
##   577   606       1   0.662 0.01559       0.632       0.693
##   578   605       2   0.659 0.01561       0.630       0.691
##   581   603       1   0.658 0.01563       0.628       0.690
##   583   602       1   0.657 0.01564       0.627       0.689
##   591   601       1   0.656 0.01565       0.626       0.688
##   593   600       3   0.653 0.01569       0.623       0.684
##   594   597       1   0.652 0.01570       0.622       0.683
##   599   596       1   0.651 0.01571       0.621       0.682
##   602   594       1   0.650 0.01572       0.620       0.681
##   604   593       1   0.649 0.01573       0.618       0.680
##   608   592       1   0.647 0.01574       0.617       0.679
##   613   591       1   0.646 0.01576       0.616       0.678
##   615   590       1   0.645 0.01577       0.615       0.677
##   616   589       1   0.644 0.01578       0.614       0.676
##   617   588       1   0.643 0.01579       0.613       0.675
##   622   587       1   0.642 0.01580       0.612       0.674
##   625   586       1   0.641 0.01581       0.611       0.673
##   632   584       1   0.640 0.01582       0.610       0.672
##   636   583       1   0.639 0.01583       0.608       0.670
##   638   582       1   0.638 0.01584       0.607       0.669
##   649   581       1   0.636 0.01585       0.606       0.668
##   653   580       1   0.635 0.01586       0.605       0.667
##   654   579       1   0.634 0.01588       0.604       0.666
##   657   578       1   0.633 0.01589       0.603       0.665
##   659   577       1   0.632 0.01590       0.602       0.664
##   663   576       2   0.630 0.01592       0.599       0.662
##   668   573       1   0.629 0.01593       0.598       0.661
##   672   572       1   0.628 0.01594       0.597       0.660
##   675   571       1   0.627 0.01595       0.596       0.659
##   680   570       1   0.626 0.01596       0.595       0.658
##   683   569       1   0.624 0.01597       0.594       0.657
##   686   568       1   0.623 0.01598       0.593       0.655
##   697   567       1   0.622 0.01599       0.592       0.654
##   700   566       2   0.620 0.01600       0.589       0.652
##   701   564       1   0.619 0.01601       0.588       0.651
##   702   563       2   0.617 0.01603       0.586       0.649
##   711   561       1   0.616 0.01604       0.585       0.648
##   712   560       1   0.615 0.01605       0.584       0.647
##   717   559       1   0.613 0.01606       0.583       0.646
##   726   558       1   0.612 0.01607       0.582       0.645
##   730   557       1   0.611 0.01608       0.581       0.644
##   731   556       1   0.610 0.01609       0.579       0.642
##   735   555       1   0.609 0.01609       0.578       0.641
##   739   554       1   0.608 0.01610       0.577       0.640
##   742   553       1   0.607 0.01611       0.576       0.639
##   748   552       1   0.606 0.01612       0.575       0.638
##   751   551       1   0.605 0.01613       0.574       0.637
##   752   550       1   0.604 0.01614       0.573       0.636
##   772   549       1   0.602 0.01614       0.572       0.635
##   774   548       1   0.601 0.01615       0.570       0.634
##   797   547       1   0.600 0.01616       0.569       0.633
##   803   546       1   0.599 0.01617       0.568       0.632
```

```
##   805    545       1    0.598 0.01617        0.567        0.631
##   827    544       1    0.597 0.01618        0.566        0.630
##   828    543       1    0.596 0.01619        0.565        0.628
##   835    542       1    0.595 0.01620        0.564        0.627
##   849    539       1    0.594 0.01620        0.563        0.626
##   851    538       1    0.593 0.01621        0.562        0.625
##   853    537       1    0.591 0.01622        0.560        0.624
##   855    536       1    0.590 0.01623        0.559        0.623
##   871    535       1    0.589 0.01623        0.558        0.622
##   883    534       1    0.588 0.01624        0.557        0.621
##   891    531       1    0.587 0.01625        0.556        0.620
##   900    530       1    0.586 0.01625        0.555        0.619
##   904    529       1    0.585 0.01626        0.554        0.618
##   912    528       1    0.584 0.01627        0.553        0.616
##   918    527       1    0.583 0.01628        0.552        0.615
##   922    526       1    0.581 0.01628        0.550        0.614
##   930    525       1    0.580 0.01629        0.549        0.613
##   931    524       1    0.579 0.01630        0.548        0.612
##   934    523       1    0.578 0.01630        0.547        0.611
##   936    522       1    0.577 0.01631        0.546        0.610
##   959    520       1    0.576 0.01631        0.545        0.609
##   960    519       1    0.575 0.01632        0.544        0.608
##   968    518       1    0.574 0.01633        0.543        0.607
##   975    517       1    0.573 0.01633        0.541        0.606
##  1013    516       1    0.571 0.01634        0.540        0.604
##  1020    515       1    0.570 0.01634        0.539        0.603
##  1024    514       1    0.569 0.01635        0.538        0.602
##  1025    513       1    0.568 0.01636        0.537        0.601
##  1026    512       1    0.567 0.01636        0.536        0.600
##  1029    511       1    0.566 0.01637        0.535        0.599
##  1032    510       1    0.565 0.01637        0.534        0.598
##  1037    509       1    0.564 0.01638        0.533        0.597
##  1042    508       1    0.563 0.01638        0.531        0.596
##  1052    507       1    0.562 0.01639        0.530        0.595
##  1057    506       2    0.559 0.01640        0.528        0.592
##  1081    504       1    0.558 0.01640        0.527        0.591
##  1089    503       1    0.557 0.01641        0.526        0.590
##  1106    501       1    0.556 0.01641        0.525        0.589
##  1108    500       1    0.555 0.01642        0.524        0.588
##  1114    499       1    0.554 0.01642        0.522        0.587
##  1122    498       1    0.553 0.01643        0.521        0.586
##  1130    497       1    0.552 0.01643        0.520        0.585
##  1139    496       1    0.550 0.01644        0.519        0.584
##  1142    495       1    0.549 0.01644        0.518        0.582
##  1159    494       1    0.548 0.01645        0.517        0.581
##  1183    493       1    0.547 0.01645        0.516        0.580
##  1211    491       1    0.546 0.01645        0.515        0.579
##  1233    490       1    0.545 0.01646        0.514        0.578
##  1236    489       1    0.544 0.01646        0.512        0.577
##  1274    488       1    0.543 0.01647        0.511        0.576
##  1275    487       1    0.541 0.01647        0.510        0.575
##  1277    486       1    0.540 0.01647        0.509        0.574
##  1298    484       1    0.539 0.01648        0.508        0.573
##  1323    482       1    0.538 0.01648        0.507        0.571
```

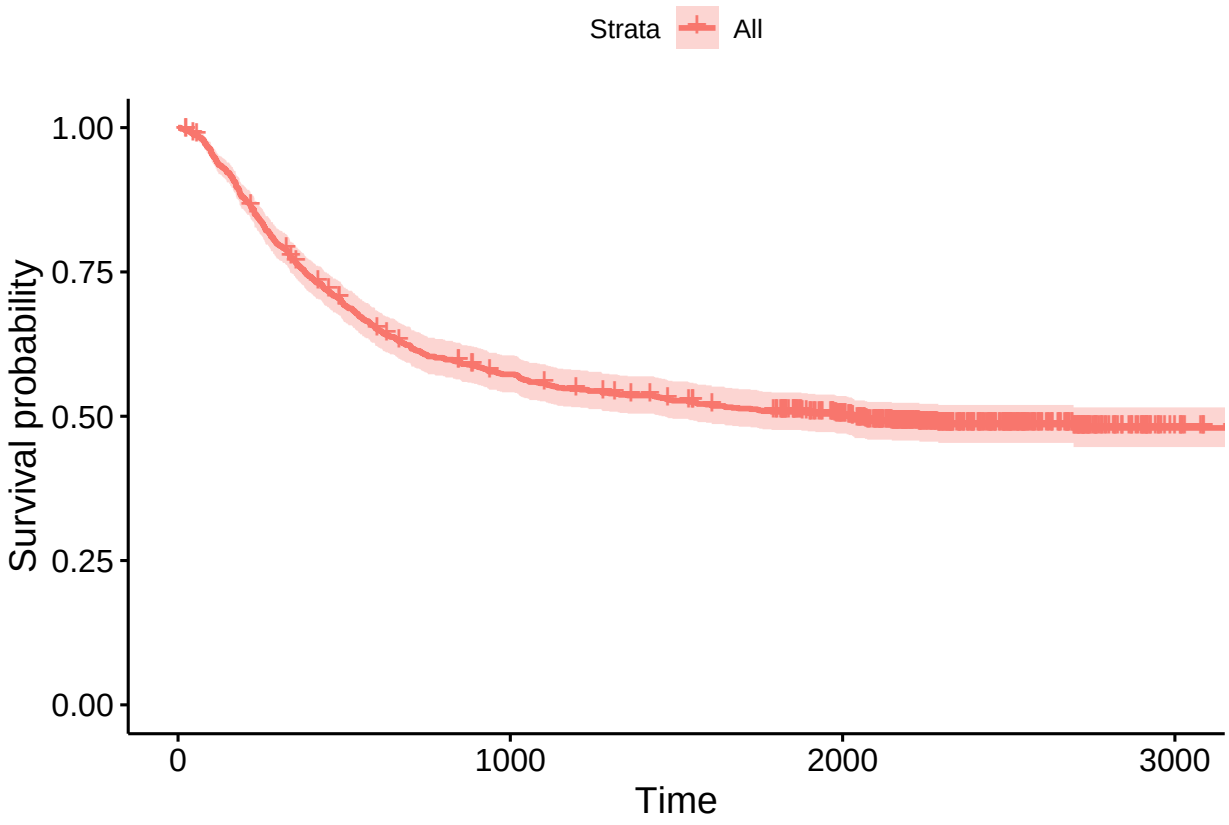
```
##  1329    481       1    0.537 0.01648        0.506        0.570
##  1353    480       1    0.536 0.01649        0.505        0.569
##  1432    477       1    0.535 0.01649        0.503        0.568
##  1436    476       1    0.534 0.01650        0.502        0.567
##  1446    475       1    0.533 0.01650        0.501        0.566
##  1455    474       1    0.531 0.01650        0.500        0.565
##  1466    473       1    0.530 0.01651        0.499        0.564
##  1471    472       1    0.529 0.01651        0.498        0.563
##  1475    470       1    0.528 0.01651        0.497        0.561
##  1488    469       1    0.527 0.01652        0.496        0.560
##  1535    468       1    0.526 0.01652        0.494        0.559
##  1539    466       1    0.525 0.01652        0.493        0.558
##  1551    463       1    0.524 0.01652        0.492        0.557
##  1561    462       1    0.522 0.01653        0.491        0.556
##  1564    461       1    0.521 0.01653        0.490        0.555
##  1589    460       1    0.520 0.01653        0.489        0.554
##  1606    459       2    0.518 0.01654        0.486        0.551
##  1644    456       1    0.517 0.01654        0.485        0.550
##  1647    455       1    0.516 0.01654        0.484        0.549
##  1668    454       1    0.514 0.01655        0.483        0.548
##  1687    453       1    0.513 0.01655        0.482        0.547
##  1723    452       1    0.512 0.01655        0.481        0.546
##  1743    451       1    0.511 0.01655        0.480        0.545
##  1749    450       1    0.510 0.01656        0.478        0.543
##  1759    449       1    0.509 0.01656        0.477        0.542
##  1786    448       1    0.508 0.01656        0.476        0.541
##  1876    423       1    0.506 0.01656        0.475        0.540
##  1895    420       1    0.505 0.01657        0.474        0.539
##  1918    415       1    0.504 0.01657        0.473        0.538
##  1976    405       1    0.503 0.01658        0.471        0.536
##  1981    401       1    0.502 0.01658        0.470        0.535
##  2012    389       1    0.500 0.01659        0.469        0.534
##  2018    388       1    0.499 0.01660        0.467        0.533
##  2028    383       1    0.498 0.01661        0.466        0.531
##  2031    380       1    0.496 0.01662        0.465        0.530
##  2035    379       1    0.495 0.01662        0.463        0.529
##  2036    378       1    0.494 0.01663        0.462        0.527
##  2067    367       1    0.492 0.01664        0.461        0.526
##  2074    364       1    0.491 0.01665        0.459        0.525
##  2148    327       1    0.489 0.01667        0.458        0.523
##  2231    262       1    0.488 0.01671        0.456        0.521
##  2288    234       1    0.486 0.01676        0.454        0.520
##  2695     84       1    0.480 0.01753        0.447        0.515
```

```
autoplot(km_fit)
```




```
ggsurvplot(km_fit, data = colon_subset_recurrence, pval = TRUE)
```

```
## Warning in .pvalue(fit, data = data, method = method, pval = pval, pval.coord = pval.coord, : There a
##  This is a null model.
```




```
km_fit <- survfit(surv~1 + obstruct, data=colon_subset_recurrence)
summary(km_fit)
```

```
## Call: survfit(formula = surv ~ 1 + obstruct, data = colon_subset_recurrence)
##
##                 obstruct=no obstruct
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##     8    749       1    0.999 0.00133        0.996        1.000
##    28    747       1    0.997 0.00189        0.994        1.000
##    38    746       1    0.996 0.00231        0.991        1.000
##    43    745       1    0.995 0.00267        0.989        1.000
##    45    744       1    0.993 0.00298        0.987        0.999
##    49    743       1    0.992 0.00326        0.986        0.998
##    62    742       2    0.989 0.00376        0.982        0.997
##    63    740       1    0.988 0.00399        0.980        0.996
##    72    739       2    0.985 0.00440        0.977        0.994
##    77    737       1    0.984 0.00459        0.975        0.993
##    78    736       1    0.983 0.00478        0.973        0.992
##    79    735       1    0.981 0.00495        0.972        0.991
##    80    734       2    0.979 0.00529        0.968        0.989
##    85    732       2    0.976 0.00560        0.965        0.987
##    86    730       2    0.973 0.00590        0.962        0.985
##    88    728       1    0.972 0.00604        0.960        0.984
##    91    727       2    0.969 0.00631        0.957        0.982
##    94    725       1    0.968 0.00644        0.955        0.981
##    98    724       2    0.965 0.00670        0.952        0.978
##   100    722       1    0.964 0.00682        0.951        0.977
##   101    721       1    0.963 0.00694        0.949        0.976
```

```
##   102   720       1   0.961 0.00706       0.947       0.975
##   105   719       1   0.960 0.00717       0.946       0.974
##   106   718       1   0.959 0.00729       0.944       0.973
##   108   717       1   0.957 0.00740       0.943       0.972
##   113   716       3   0.953 0.00772       0.938       0.968
##   116   713       2   0.951 0.00793       0.935       0.966
##   118   711       1   0.949 0.00803       0.934       0.965
##   119   710       1   0.948 0.00813       0.932       0.964
##   121   709       1   0.947 0.00823       0.931       0.963
##   122   708       1   0.945 0.00832       0.929       0.962
##   127   707       1   0.944 0.00842       0.927       0.960
##   131   706       1   0.943 0.00851       0.926       0.959
##   132   705       1   0.941 0.00860       0.924       0.958
##   136   704       1   0.940 0.00869       0.923       0.957
##   139   703       1   0.939 0.00878       0.921       0.956
##   141   702       1   0.937 0.00887       0.920       0.955
##   143   701       1   0.936 0.00896       0.918       0.954
##   145   700       1   0.934 0.00905       0.917       0.952
##   146   699       2   0.932 0.00922       0.914       0.950
##   147   697       1   0.930 0.00930       0.912       0.949
##   154   696       1   0.929 0.00938       0.911       0.948
##   157   695       2   0.926 0.00954       0.908       0.945
##   161   693       1   0.925 0.00962       0.906       0.944
##   165   692       3   0.921 0.00986       0.902       0.941
##   166   689       1   0.920 0.00993       0.901       0.939
##   167   688       1   0.918 0.01001       0.899       0.938
##   169   687       1   0.917 0.01008       0.898       0.937
##   173   686       3   0.913 0.01030       0.893       0.934
##   174   683       2   0.910 0.01044       0.890       0.931
##   176   681       2   0.908 0.01058       0.887       0.929
##   179   679       1   0.906 0.01065       0.886       0.928
##   181   678       1   0.905 0.01072       0.884       0.926
##   183   677       2   0.902 0.01085       0.881       0.924
##   185   675       2   0.900 0.01098       0.878       0.922
##   186   673       1   0.898 0.01105       0.877       0.920
##   189   672       2   0.896 0.01117       0.874       0.918
##   191   670       2   0.893 0.01130       0.871       0.915
##   196   668       1   0.892 0.01136       0.870       0.914
##   198   667       1   0.890 0.01142       0.868       0.913
##   201   666       1   0.889 0.01148       0.867       0.912
##   203   665       1   0.888 0.01154       0.865       0.911
##   204   664       1   0.886 0.01160       0.864       0.909
##   205   663       1   0.885 0.01166       0.862       0.908
##   208   662       2   0.882 0.01178       0.860       0.906
##   215   660       2   0.880 0.01190       0.857       0.903
##   216   658       1   0.878 0.01195       0.855       0.902
##   218   657       1   0.877 0.01201       0.854       0.901
##   219   656       1   0.876 0.01206       0.852       0.900
##   221   654       1   0.874 0.01212       0.851       0.898
##   224   653       1   0.873 0.01218       0.849       0.897
##   227   652       1   0.872 0.01223       0.848       0.896
##   229   651       2   0.869 0.01234       0.845       0.893
##   230   649       3   0.865 0.01250       0.841       0.890
##   235   646       1   0.864 0.01255       0.839       0.889
```

```
##   237   645       2   0.861 0.01265        0.836        0.886
##   238   643       1   0.860 0.01270        0.835        0.885
##   242   642       1   0.858 0.01275        0.834        0.884
##   243   641       1   0.857 0.01280        0.832        0.882
##   246   640       1   0.856 0.01285        0.831        0.881
##   248   639       1   0.854 0.01290        0.829        0.880
##   250   638       1   0.853 0.01295        0.828        0.879
##   252   637       1   0.852 0.01300        0.826        0.877
##   253   636       1   0.850 0.01305        0.825        0.876
##   256   635       2   0.848 0.01315        0.822        0.874
##   257   633       1   0.846 0.01319        0.821        0.872
##   260   632       1   0.845 0.01324        0.819        0.871
##   261   631       1   0.844 0.01329        0.818        0.870
##   262   630       1   0.842 0.01333        0.816        0.869
##   263   629       2   0.840 0.01342        0.814        0.866
##   264   627       1   0.838 0.01347        0.812        0.865
##   271   626       1   0.837 0.01351        0.811        0.864
##   273   625       1   0.836 0.01356        0.809        0.863
##   274   624       1   0.834 0.01360        0.808        0.861
##   276   623       1   0.833 0.01365        0.807        0.860
##   279   622       2   0.830 0.01373        0.804        0.858
##   285   620       1   0.829 0.01378        0.802        0.856
##   286   619       2   0.826 0.01386        0.799        0.854
##   290   617       1   0.825 0.01390        0.798        0.852
##   291   616       1   0.823 0.01394        0.797        0.851
##   294   615       2   0.821 0.01403        0.794        0.849
##   296   613       2   0.818 0.01411        0.791        0.846
##   303   611       1   0.817 0.01415        0.789        0.845
##   304   610       1   0.815 0.01419        0.788        0.844
##   308   609       1   0.814 0.01423        0.787        0.842
##   313   608       1   0.813 0.01427        0.785        0.841
##   315   607       2   0.810 0.01435        0.782        0.839
##   322   605       2   0.807 0.01442        0.780        0.836
##   325   603       1   0.806 0.01446        0.778        0.835
##   328   602       1   0.805 0.01450        0.777        0.834
##   329   601       1   0.803 0.01454        0.775        0.832
##   330   600       2   0.801 0.01461        0.773        0.830
##   334   598       1   0.799 0.01465        0.771        0.829
##   336   597       2   0.797 0.01472        0.768        0.826
##   337   595       2   0.794 0.01479        0.766        0.824
##   341   592       1   0.793 0.01483        0.764        0.822
##   344   591       1   0.791 0.01486        0.763        0.821
##   348   590       2   0.789 0.01493        0.760        0.818
##   349   588       1   0.787 0.01497        0.758        0.817
##   352   587       1   0.786 0.01500        0.757        0.816
##   356   585       2   0.783 0.01507        0.754        0.813
##   360   583       1   0.782 0.01511        0.753        0.812
##   362   582       1   0.781 0.01514        0.751        0.811
##   365   581       1   0.779 0.01517        0.750        0.810
##   369   580       1   0.778 0.01521        0.749        0.808
##   370   579       1   0.777 0.01524        0.747        0.807
##   372   578       1   0.775 0.01527        0.746        0.806
##   374   577       1   0.774 0.01530        0.744        0.804
##   378   576       1   0.773 0.01534        0.743        0.803
```

```
##   379   575       1   0.771 0.01537       0.742       0.802
##   380   574       2   0.768 0.01543       0.739       0.799
##   384   572       1   0.767 0.01546       0.737       0.798
##   386   571       1   0.766 0.01549       0.736       0.797
##   392   570       1   0.764 0.01553       0.735       0.795
##   393   569       1   0.763 0.01556       0.733       0.794
##   398   568       1   0.762 0.01559       0.732       0.793
##   401   567       1   0.760 0.01562       0.730       0.792
##   402   566       1   0.759 0.01565       0.729       0.790
##   405   565       1   0.758 0.01568       0.728       0.789
##   406   564       1   0.756 0.01571       0.726       0.788
##   408   563       1   0.755 0.01574       0.725       0.787
##   415   562       1   0.754 0.01577       0.723       0.785
##   429   560       1   0.752 0.01579       0.722       0.784
##   431   559       1   0.751 0.01582       0.721       0.783
##   433   558       1   0.750 0.01585       0.719       0.781
##   434   557       1   0.748 0.01588       0.718       0.780
##   435   556       1   0.747 0.01591       0.716       0.779
##   437   555       1   0.746 0.01594       0.715       0.778
##   438   554       1   0.744 0.01597       0.714       0.776
##   439   553       1   0.743 0.01599       0.712       0.775
##   440   552       1   0.742 0.01602       0.711       0.774
##   443   551       1   0.740 0.01605       0.709       0.772
##   448   550       1   0.739 0.01608       0.708       0.771
##   454   548       2   0.736 0.01613       0.705       0.769
##   458   546       2   0.734 0.01618       0.702       0.766
##   461   544       1   0.732 0.01621       0.701       0.765
##   465   543       1   0.731 0.01623       0.700       0.763
##   466   542       2   0.728 0.01629       0.697       0.761
##   474   540       1   0.727 0.01631       0.695       0.759
##   480   539       1   0.725 0.01634       0.694       0.758
##   482   538       1   0.724 0.01636       0.693       0.757
##   485   537       1   0.723 0.01639       0.691       0.756
##   490   535       1   0.721 0.01641       0.690       0.754
##   491   534       2   0.719 0.01646       0.687       0.752
##   495   532       1   0.717 0.01649       0.686       0.750
##   496   531       1   0.716 0.01651       0.684       0.749
##   497   530       1   0.715 0.01653       0.683       0.748
##   498   529       1   0.713 0.01656       0.682       0.746
##   499   528       1   0.712 0.01658       0.680       0.745
##   505   527       1   0.711 0.01661       0.679       0.744
##   510   526       1   0.709 0.01663       0.677       0.743
##   511   525       1   0.708 0.01665       0.676       0.741
##   513   524       1   0.707 0.01667       0.675       0.740
##   523   523       1   0.705 0.01670       0.673       0.739
##   525   522       1   0.704 0.01672       0.672       0.737
##   526   521       1   0.702 0.01674       0.670       0.736
##   532   520       1   0.701 0.01676       0.669       0.735
##   534   519       1   0.700 0.01679       0.668       0.733
##   536   518       1   0.698 0.01681       0.666       0.732
##   540   517       1   0.697 0.01683       0.665       0.731
##   542   516       1   0.696 0.01685       0.663       0.730
##   543   515       2   0.693 0.01689       0.661       0.727
##   547   513       1   0.692 0.01692       0.659       0.726
```

```
##   548   512     1   0.690 0.01694      0.658      0.724
##   554   511     1   0.689 0.01696      0.657      0.723
##   555   510     1   0.688 0.01698      0.655      0.722
##   560   509     1   0.686 0.01700      0.654      0.720
##   565   508     1   0.685 0.01702      0.652      0.719
##   573   507     2   0.682 0.01706      0.650      0.716
##   578   505     2   0.679 0.01710      0.647      0.714
##   583   503     1   0.678 0.01712      0.645      0.713
##   591   502     1   0.677 0.01714      0.644      0.711
##   593   501     3   0.673 0.01719      0.640      0.707
##   594   498     1   0.671 0.01721      0.638      0.706
##   599   497     1   0.670 0.01723      0.637      0.705
##   602   495     1   0.669 0.01725      0.636      0.703
##   608   494     1   0.667 0.01726      0.634      0.702
##   613   493     1   0.666 0.01728      0.633      0.701
##   615   492     1   0.665 0.01730      0.632      0.699
##   616   491     1   0.663 0.01732      0.630      0.698
##   617   490     1   0.662 0.01734      0.629      0.697
##   622   489     1   0.661 0.01735      0.627      0.695
##   632   487     1   0.659 0.01737      0.626      0.694
##   636   486     1   0.658 0.01739      0.625      0.693
##   638   485     1   0.656 0.01740      0.623      0.692
##   649   484     1   0.655 0.01742      0.622      0.690
##   654   483     1   0.654 0.01744      0.620      0.689
##   657   482     1   0.652 0.01745      0.619      0.688
##   659   481     1   0.651 0.01747      0.618      0.686
##   663   480     2   0.648 0.01750      0.615      0.684
##   668   477     1   0.647 0.01752      0.614      0.682
##   672   476     1   0.646 0.01753      0.612      0.681
##   675   475     1   0.644 0.01755      0.611      0.680
##   680   474     1   0.643 0.01757      0.609      0.678
##   683   473     1   0.642 0.01758      0.608      0.677
##   686   472     1   0.640 0.01760      0.607      0.676
##   697   471     1   0.639 0.01761      0.605      0.674
##   700   470     2   0.636 0.01764      0.602      0.672
##   701   468     1   0.635 0.01766      0.601      0.670
##   702   467     2   0.632 0.01768      0.598      0.668
##   711   465     1   0.631 0.01770      0.597      0.666
##   712   464     1   0.629 0.01771      0.596      0.665
##   717   463     1   0.628 0.01773      0.594      0.664
##   730   462     1   0.627 0.01774      0.593      0.662
##   731   461     1   0.625 0.01775      0.591      0.661
##   735   460     1   0.624 0.01777      0.590      0.660
##   739   459     1   0.623 0.01778      0.589      0.658
##   742   458     1   0.621 0.01779      0.587      0.657
##   748   457     1   0.620 0.01781      0.586      0.656
##   751   456     1   0.618 0.01782      0.584      0.654
##   752   455     1   0.617 0.01783      0.583      0.653
##   774   454     1   0.616 0.01784      0.582      0.652
##   803   453     1   0.614 0.01786      0.580      0.650
##   805   452     1   0.613 0.01787      0.579      0.649
##   827   451     1   0.612 0.01788      0.578      0.648
##   835   450     1   0.610 0.01789      0.576      0.646
##   849   447     1   0.609 0.01790      0.575      0.645
```

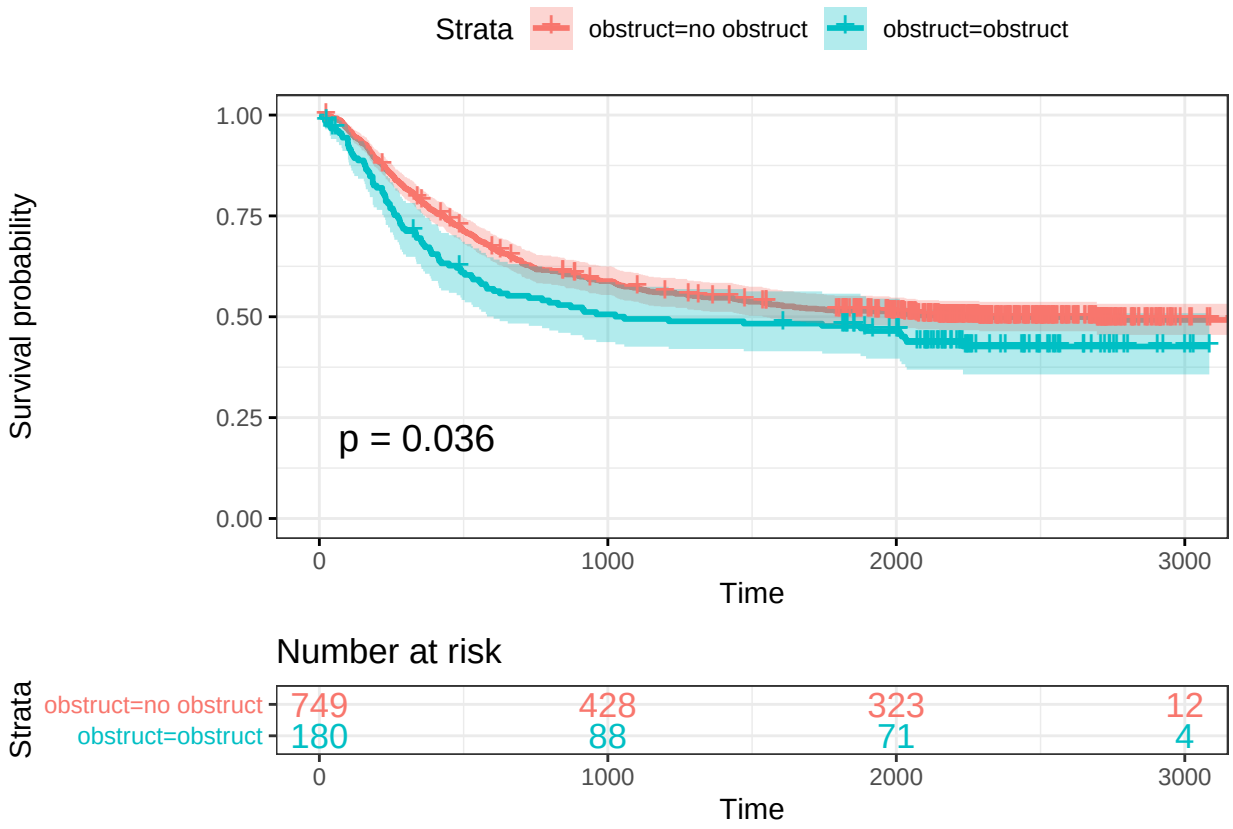
```
##   851    446       1    0.608 0.01792       0.573       0.644
##   853    445       1    0.606 0.01793       0.572       0.642
##   855    444       1    0.605 0.01794       0.571       0.641
##   883    443       1    0.603 0.01795       0.569       0.640
##   891    440       1    0.602 0.01796       0.568       0.638
##   900    439       1    0.601 0.01797       0.567       0.637
##   904    438       1    0.599 0.01798       0.565       0.636
##   922    437       1    0.598 0.01800       0.564       0.634
##   930    436       1    0.597 0.01801       0.562       0.633
##   931    435       1    0.595 0.01802       0.561       0.632
##   934    434       1    0.594 0.01803       0.560       0.630
##   936    433       1    0.592 0.01804       0.558       0.629
##   959    431       1    0.591 0.01805       0.557       0.628
##   968    430       1    0.590 0.01806       0.555       0.626
##   975    429       1    0.588 0.01807       0.554       0.625
##  1013    428       1    0.587 0.01808       0.553       0.624
##  1020    427       1    0.586 0.01809       0.551       0.622
##  1024    426       1    0.584 0.01810       0.550       0.621
##  1025    425       1    0.583 0.01811       0.548       0.619
##  1029    424       1    0.581 0.01812       0.547       0.618
##  1032    423       1    0.580 0.01813       0.546       0.617
##  1037    422       1    0.579 0.01814       0.544       0.615
##  1042    421       1    0.577 0.01815       0.543       0.614
##  1052    420       1    0.576 0.01815       0.541       0.613
##  1057    419       1    0.575 0.01816       0.540       0.611
##  1081    418       1    0.573 0.01817       0.539       0.610
##  1089    417       1    0.572 0.01818       0.537       0.609
##  1106    415       1    0.570 0.01819       0.536       0.607
##  1108    414       1    0.569 0.01820       0.535       0.606
##  1114    413       1    0.568 0.01820       0.533       0.605
##  1122    412       1    0.566 0.01821       0.532       0.603
##  1130    411       1    0.565 0.01822       0.530       0.602
##  1139    410       1    0.564 0.01823       0.529       0.600
##  1142    409       1    0.562 0.01823       0.528       0.599
##  1159    408       1    0.561 0.01824       0.526       0.598
##  1183    407       1    0.559 0.01825       0.525       0.596
##  1233    405       1    0.558 0.01826       0.523       0.595
##  1236    404       1    0.557 0.01826       0.522       0.594
##  1274    403       1    0.555 0.01827       0.521       0.592
##  1275    402       1    0.554 0.01828       0.519       0.591
##  1277    401       1    0.553 0.01828       0.518       0.590
##  1298    399       1    0.551 0.01829       0.516       0.588
##  1323    397       1    0.550 0.01830       0.515       0.587
##  1329    396       1    0.548 0.01830       0.514       0.585
##  1353    395       1    0.547 0.01831       0.512       0.584
##  1432    392       1    0.546 0.01832       0.511       0.583
##  1436    391       1    0.544 0.01832       0.509       0.581
##  1446    390       1    0.543 0.01833       0.508       0.580
##  1455    389       1    0.541 0.01833       0.507       0.579
##  1466    388       1    0.540 0.01834       0.505       0.577
##  1475    386       1    0.539 0.01835       0.504       0.576
##  1488    385       1    0.537 0.01835       0.502       0.574
##  1535    384       1    0.536 0.01836       0.501       0.573
##  1539    382       1    0.534 0.01836       0.500       0.572
```

```
##  1551    379       1    0.533 0.01837        0.498        0.570
##  1561    378       1    0.532 0.01837        0.497        0.569
##  1564    377       1    0.530 0.01838        0.495        0.567
##  1589    376       1    0.529 0.01838        0.494        0.566
##  1606    375       2    0.526 0.01839        0.491        0.563
##  1644    373       1    0.525 0.01840        0.490        0.562
##  1647    372       1    0.523 0.01840        0.488        0.560
##  1668    371       1    0.522 0.01841        0.487        0.559
##  1687    370       1    0.520 0.01841        0.485        0.558
##  1723    369       1    0.519 0.01842        0.484        0.556
##  1749    368       1    0.518 0.01842        0.483        0.555
##  1759    367       1    0.516 0.01842        0.481        0.554
##  1786    366       1    0.515 0.01843        0.480        0.552
##  1918    342       1    0.513 0.01843        0.478        0.551
##  1976    333       1    0.512 0.01844        0.477        0.549
##  1981    330       1    0.510 0.01845        0.475        0.548
##  2028    317       1    0.508 0.01846        0.474        0.546
##  2035    314       1    0.507 0.01848        0.472        0.544
##  2067    303       1    0.505 0.01849        0.470        0.543
##  2074    301       1    0.504 0.01850        0.469        0.541
##  2148    275       1    0.502 0.01853        0.467        0.539
##  2288    201       1    0.499 0.01860        0.464        0.537
##  2695     70       1    0.492 0.01966        0.455        0.532
##
##                obstruct=obstruct
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##     9    180       1    0.994 0.00554        0.984        1.000
##    19    179       1    0.989 0.00781        0.974        1.000
##    20    178       1    0.983 0.00954        0.965        1.000
##    35    176       1    0.978 0.01100        0.956        1.000
##    36    175       1    0.972 0.01228        0.948        0.997
##    40    174       1    0.967 0.01342        0.941        0.993
##    59    171       1    0.961 0.01448        0.933        0.990
##    68    170       1    0.955 0.01546        0.925        0.986
##    77    169       1    0.950 0.01637        0.918        0.982
##    80    168       1    0.944 0.01722        0.911        0.978
##    98    167       1    0.938 0.01802        0.904        0.974
##    99    166       2    0.927 0.01950        0.890        0.966
##   101    164       1    0.921 0.02018        0.883        0.962
##   103    163       1    0.916 0.02083        0.876        0.957
##   109    162       1    0.910 0.02146        0.869        0.953
##   111    161       1    0.904 0.02206        0.862        0.949
##   116    160       1    0.899 0.02263        0.855        0.944
##   121    159       1    0.893 0.02318        0.849        0.940
##   134    158       1    0.887 0.02372        0.842        0.935
##   154    157       1    0.882 0.02423        0.836        0.931
##   157    156       1    0.876 0.02472        0.829        0.926
##   160    155       1    0.870 0.02520        0.822        0.921
##   161    154       1    0.865 0.02566        0.816        0.917
##   168    153       1    0.859 0.02611        0.809        0.912
##   174    152       1    0.854 0.02655        0.803        0.907
##   175    151       1    0.848 0.02696        0.797        0.902
##   185    150       3    0.831 0.02815        0.778        0.888
##   188    147       1    0.825 0.02852        0.771        0.883
```

```
##   199    146       1    0.820 0.02888        0.765        0.878
##   218    145       2    0.808 0.02956        0.752        0.868
##   223    143       1    0.803 0.02989        0.746        0.863
##   228    142       1    0.797 0.03021        0.740        0.858
##   230    141       2    0.786 0.03082        0.728        0.848
##   238    139       1    0.780 0.03111        0.721        0.843
##   245    138       2    0.769 0.03167        0.709        0.833
##   255    136       1    0.763 0.03194        0.703        0.828
##   258    135       1    0.757 0.03220        0.697        0.823
##   260    134       1    0.752 0.03245        0.691        0.818
##   271    133       1    0.746 0.03270        0.685        0.813
##   276    132       1    0.740 0.03294        0.679        0.808
##   279    131       1    0.735 0.03317        0.673        0.803
##   280    130       1    0.729 0.03339        0.667        0.798
##   286    129       1    0.724 0.03360        0.661        0.792
##   290    128       1    0.718 0.03381        0.655        0.787
##   300    127       1    0.712 0.03402        0.649        0.782
##   333    125       1    0.707 0.03422        0.643        0.777
##   335    124       1    0.701 0.03441        0.637        0.772
##   337    123       1    0.695 0.03460        0.631        0.766
##   352    122       1    0.689 0.03478        0.625        0.761
##   354    121       1    0.684 0.03496        0.619        0.756
##   360    120       1    0.678 0.03513        0.613        0.750
##   366    119       1    0.672 0.03529        0.607        0.745
##   382    118       1    0.667 0.03545        0.601        0.740
##   386    117       1    0.661 0.03560        0.595        0.735
##   389    116       1    0.655 0.03575        0.589        0.729
##   411    115       1    0.650 0.03589        0.583        0.724
##   413    114       1    0.644 0.03603        0.577        0.718
##   415    113       1    0.638 0.03615        0.571        0.713
##   422    112       1    0.632 0.03628        0.565        0.708
##   449    111       1    0.627 0.03640        0.559        0.702
##   476    110       1    0.621 0.03651        0.553        0.697
##   489    108       1    0.615 0.03662        0.548        0.691
##   493    107       1    0.610 0.03673        0.542        0.686
##   504    106       1    0.604 0.03683        0.536        0.680
##   527    105       1    0.598 0.03692        0.530        0.675
##   532    104       1    0.592 0.03701        0.524        0.669
##   554    103       1    0.587 0.03710        0.518        0.664
##   561    102       1    0.581 0.03718        0.512        0.658
##   577    101       1    0.575 0.03725        0.506        0.653
##   581    100       1    0.569 0.03732        0.501        0.647
##   604     99       1    0.564 0.03738        0.495        0.642
##   625     98       1    0.558 0.03744        0.489        0.636
##   653     97       1    0.552 0.03749        0.483        0.631
##   726     96       1    0.546 0.03754        0.477        0.625
##   772     95       1    0.541 0.03758        0.472        0.619
##   797     94       1    0.535 0.03762        0.466        0.614
##   828     93       1    0.529 0.03765        0.460        0.608
##   871     92       1    0.523 0.03768        0.454        0.603
##   912     91       1    0.518 0.03770        0.449        0.597
##   918     90       1    0.512 0.03772        0.443        0.591
##   960     89       1    0.506 0.03773        0.437        0.586
##  1026     88       1    0.500 0.03774        0.432        0.580
```

```
##   1057      87       1    0.495 0.03774        0.426        0.574
##   1211      86       1    0.489 0.03774        0.420        0.569
##   1471      85       1    0.483 0.03773        0.414        0.563
##   1743      83       1    0.477 0.03772        0.409        0.557
##   1876      76       1    0.471 0.03774        0.402        0.551
##   1895      74       1    0.465 0.03777        0.396        0.545
##   2012      68       1    0.458 0.03782        0.389        0.538
##   2018      67       1    0.451 0.03787        0.382        0.532
##   2031      66       1    0.444 0.03791        0.376        0.525
##   2036      65       1    0.437 0.03794        0.369        0.518
##   2231      40       1    0.426 0.03853        0.357        0.509
```

```
ggsurvplot(km_fit, data = colon_subset_recurrence, pval = TRUE,conf.int = TRUE,
           risk.table = TRUE, ggtheme = theme_bw(),risk.table.col = "strata")
```




```
km_fit <- survfit(surv~1 + adhere, data=colon_subset_recurrence)
summary(km_fit)
```

```
## Call: survfit(formula = surv ~ 1 + adhere, data = colon_subset_recurrence)
##
##                 adhere=no adhere
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##     8    794       1    0.999 0.00126        0.996        1.000
##     9    793       1    0.997 0.00178        0.994        1.000
##    19    792       1    0.996 0.00218        0.992        1.000
##    20    791       1    0.995 0.00251        0.990        1.000
##    28    788       1    0.994 0.00281        0.988        0.999
##    35    787       1    0.992 0.00308        0.986        0.998
##    38    786       1    0.991 0.00332        0.985        0.998
```

```
##    40    785       1    0.990 0.00355        0.983        0.997
##    43    784       1    0.989 0.00376        0.981        0.996
##    45    783       1    0.987 0.00396        0.980        0.995
##    49    781       1    0.986 0.00416        0.978        0.994
##    59    779       1    0.985 0.00434        0.976        0.993
##    62    778       2    0.982 0.00468        0.973        0.992
##    63    776       1    0.981 0.00484        0.972        0.991
##    72    775       2    0.979 0.00515        0.968        0.989
##    77    773       2    0.976 0.00544        0.965        0.987
##    78    771       1    0.975 0.00558        0.964        0.986
##    79    770       1    0.973 0.00571        0.962        0.985
##    80    769       2    0.971 0.00597        0.959        0.983
##    85    767       2    0.968 0.00622        0.956        0.981
##    86    765       1    0.967 0.00634        0.955        0.980
##    91    764       2    0.965 0.00657        0.952        0.978
##    94    762       1    0.963 0.00668        0.950        0.977
##    98    761       3    0.960 0.00701        0.946        0.973
##    99    758       2    0.957 0.00721        0.943        0.971
##   100    756       1    0.956 0.00731        0.942        0.970
##   101    755       1    0.954 0.00741        0.940        0.969
##   102    754       1    0.953 0.00751        0.939        0.968
##   103    753       1    0.952 0.00761        0.937        0.967
##   106    752       1    0.951 0.00770        0.936        0.966
##   108    751       1    0.949 0.00779        0.934        0.965
##   111    750       1    0.948 0.00789        0.933        0.964
##   113    749       3    0.944 0.00815        0.929        0.960
##   116    746       2    0.942 0.00833        0.926        0.958
##   119    744       1    0.941 0.00841        0.924        0.957
##   121    743       1    0.939 0.00849        0.923        0.956
##   122    742       1    0.938 0.00858        0.921        0.955
##   127    741       1    0.937 0.00866        0.920        0.954
##   131    740       1    0.935 0.00874        0.919        0.953
##   132    739       1    0.934 0.00882        0.917        0.952
##   134    738       1    0.933 0.00890        0.916        0.951
##   136    737       1    0.932 0.00897        0.914        0.949
##   139    736       1    0.930 0.00905        0.913        0.948
##   141    735       1    0.929 0.00913        0.911        0.947
##   143    734       1    0.928 0.00920        0.910        0.946
##   145    733       1    0.927 0.00927        0.909        0.945
##   146    732       2    0.924 0.00942        0.906        0.943
##   147    730       1    0.923 0.00949        0.904        0.942
##   157    729       2    0.920 0.00963        0.902        0.939
##   160    727       1    0.919 0.00970        0.900        0.938
##   161    726       2    0.916 0.00984        0.897        0.936
##   165    724       3    0.913 0.01004        0.893        0.933
##   166    721       1    0.911 0.01011        0.892        0.931
##   167    720       1    0.910 0.01017        0.890        0.930
##   168    719       1    0.909 0.01024        0.889        0.929
##   169    718       1    0.908 0.01030        0.888        0.928
##   173    717       3    0.904 0.01049        0.884        0.925
##   174    714       3    0.900 0.01067        0.879        0.921
##   175    711       1    0.899 0.01073        0.878        0.920
##   176    710       2    0.896 0.01085        0.875        0.918
##   179    708       1    0.895 0.01091        0.874        0.917
```

```
##   181   707       1   0.894 0.01096        0.872        0.915
##   183   706       2   0.891 0.01108        0.870        0.913
##   185   704       4   0.886 0.01130        0.864        0.909
##   186   700       1   0.885 0.01135        0.863        0.907
##   188   699       1   0.884 0.01141        0.862        0.906
##   189   698       1   0.882 0.01146        0.860        0.905
##   191   697       2   0.880 0.01157        0.857        0.903
##   196   695       1   0.879 0.01162        0.856        0.902
##   199   694       1   0.877 0.01167        0.855        0.900
##   201   693       1   0.876 0.01172        0.853        0.899
##   203   692       1   0.875 0.01178        0.852        0.898
##   205   691       1   0.873 0.01183        0.851        0.897
##   208   690       1   0.872 0.01188        0.849        0.896
##   215   689       2   0.870 0.01198        0.847        0.893
##   216   687       1   0.868 0.01203        0.845        0.892
##   218   686       2   0.866 0.01212        0.842        0.890
##   221   683       1   0.865 0.01217        0.841        0.889
##   224   682       1   0.863 0.01222        0.840        0.888
##   227   681       1   0.862 0.01227        0.838        0.886
##   228   680       1   0.861 0.01231        0.837        0.885
##   229   679       1   0.860 0.01236        0.836        0.884
##   230   678       5   0.853 0.01259        0.829        0.878
##   235   673       1   0.852 0.01264        0.828        0.877
##   237   672       2   0.849 0.01273        0.825        0.875
##   238   670       2   0.847 0.01281        0.822        0.872
##   245   668       2   0.844 0.01290        0.819        0.870
##   246   666       1   0.843 0.01294        0.818        0.869
##   248   665       1   0.842 0.01298        0.817        0.868
##   250   664       1   0.841 0.01303        0.815        0.866
##   252   663       1   0.839 0.01307        0.814        0.865
##   255   662       1   0.838 0.01311        0.813        0.864
##   256   661       2   0.835 0.01319        0.810        0.862
##   260   659       2   0.833 0.01327        0.807        0.859
##   261   657       1   0.832 0.01331        0.806        0.858
##   262   656       1   0.830 0.01335        0.805        0.857
##   263   655       2   0.828 0.01343        0.802        0.855
##   264   653       1   0.827 0.01347        0.801        0.853
##   271   652       1   0.825 0.01351        0.799        0.852
##   273   651       1   0.824 0.01355        0.798        0.851
##   274   650       1   0.823 0.01359        0.797        0.850
##   276   649       2   0.820 0.01366        0.794        0.847
##   279   647       2   0.818 0.01374        0.791        0.845
##   280   645       1   0.816 0.01378        0.790        0.844
##   285   644       1   0.815 0.01381        0.789        0.843
##   286   643       3   0.811 0.01392        0.785        0.839
##   290   640       2   0.809 0.01399        0.782        0.837
##   291   638       1   0.808 0.01403        0.781        0.836
##   294   637       1   0.806 0.01406        0.779        0.834
##   296   636       2   0.804 0.01413        0.777        0.832
##   300   634       1   0.802 0.01417        0.775        0.831
##   303   633       1   0.801 0.01420        0.774        0.830
##   304   632       1   0.800 0.01424        0.773        0.828
##   308   631       1   0.799 0.01427        0.771        0.827
##   313   630       1   0.797 0.01430        0.770        0.826
```

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##   315   629       2    0.795 0.01437        0.767        0.824
##   322   627       2    0.792 0.01444        0.765        0.821
##   325   625       1    0.791 0.01447        0.763        0.820
##   329   623       1    0.790 0.01450        0.762        0.819
##   330   622       2    0.787 0.01456        0.759        0.816
##   335   620       1    0.786 0.01460        0.758        0.815
##   336   619       2    0.783 0.01466        0.755        0.813
##   337   617       2    0.781 0.01472        0.753        0.810
##   341   615       1    0.780 0.01475        0.751        0.809
##   344   614       1    0.778 0.01478        0.750        0.808
##   348   613       2    0.776 0.01484        0.747        0.805
##   349   611       1    0.775 0.01487        0.746        0.804
##   352   610       1    0.773 0.01490        0.745        0.803
##   354   609       1    0.772 0.01493        0.743        0.802
##   356   607       1    0.771 0.01496        0.742        0.801
##   360   606       1    0.769 0.01499        0.741        0.799
##   362   605       1    0.768 0.01502        0.739        0.798
##   365   604       1    0.767 0.01505        0.738        0.797
##   366   603       1    0.766 0.01508        0.737        0.796
##   370   602       1    0.764 0.01511        0.735        0.795
##   372   601       1    0.763 0.01513        0.734        0.793
##   374   600       1    0.762 0.01516        0.733        0.792
##   378   599       1    0.761 0.01519        0.731        0.791
##   379   598       1    0.759 0.01522        0.730        0.790
##   380   597       1    0.758 0.01525        0.729        0.789
##   382   596       1    0.757 0.01527        0.727        0.787
##   384   595       1    0.755 0.01530        0.726        0.786
##   386   594       2    0.753 0.01535        0.723        0.784
##   389   592       1    0.752 0.01538        0.722        0.782
##   392   591       1    0.750 0.01541        0.721        0.781
##   393   590       1    0.749 0.01543        0.719        0.780
##   398   589       1    0.748 0.01546        0.718        0.779
##   401   588       1    0.747 0.01549        0.717        0.778
##   402   587       1    0.745 0.01551        0.716        0.776
##   406   586       1    0.744 0.01554        0.714        0.775
##   408   585       1    0.743 0.01556        0.713        0.774
##   411   584       1    0.741 0.01559        0.712        0.773
##   413   583       1    0.740 0.01561        0.710        0.771
##   415   582       1    0.739 0.01564        0.709        0.770
##   422   580       1    0.738 0.01566        0.708        0.769
##   429   579       1    0.736 0.01569        0.706        0.768
##   431   578       1    0.735 0.01571        0.705        0.767
##   433   577       1    0.734 0.01574        0.704        0.765
##   434   576       1    0.733 0.01576        0.702        0.764
##   435   575       1    0.731 0.01578        0.701        0.763
##   438   574       1    0.730 0.01581        0.700        0.762
##   440   573       1    0.729 0.01583        0.698        0.760
##   443   572       1    0.727 0.01585        0.697        0.759
##   448   571       1    0.726 0.01588        0.696        0.758
##   449   570       1    0.725 0.01590        0.694        0.757
##   454   568       2    0.722 0.01595        0.692        0.754
##   458   566       1    0.721 0.01597        0.690        0.753
##   461   565       1    0.720 0.01599        0.689        0.752
##   466   564       2    0.717 0.01604        0.687        0.749
```

```
##   476   562       1   0.716 0.01606        0.685        0.748
##   482   561       1   0.715 0.01608        0.684        0.747
##   485   560       1   0.713 0.01610        0.683        0.746
##   489   557       1   0.712 0.01613        0.681        0.744
##   491   556       2   0.710 0.01617        0.679        0.742
##   493   554       1   0.708 0.01619        0.677        0.741
##   495   553       1   0.707 0.01621        0.676        0.740
##   496   552       1   0.706 0.01623        0.675        0.738
##   498   551       1   0.704 0.01625        0.673        0.737
##   499   550       1   0.703 0.01627        0.672        0.736
##   504   549       1   0.702 0.01630        0.671        0.735
##   505   548       1   0.701 0.01632        0.669        0.733
##   510   547       1   0.699 0.01634        0.668        0.732
##   511   546       1   0.698 0.01636        0.667        0.731
##   523   545       1   0.697 0.01638        0.665        0.730
##   525   544       1   0.696 0.01640        0.664        0.728
##   527   543       1   0.694 0.01642        0.663        0.727
##   532   542       1   0.693 0.01644        0.661        0.726
##   534   541       1   0.692 0.01646        0.660        0.725
##   536   540       1   0.690 0.01647        0.659        0.723
##   540   539       1   0.689 0.01649        0.658        0.722
##   543   538       2   0.687 0.01653        0.655        0.720
##   547   536       1   0.685 0.01655        0.654        0.718
##   554   535       2   0.683 0.01659        0.651        0.716
##   555   533       1   0.681 0.01661        0.650        0.715
##   560   532       1   0.680 0.01662        0.648        0.714
##   561   531       1   0.679 0.01664        0.647        0.712
##   565   530       1   0.678 0.01666        0.646        0.711
##   573   529       2   0.675 0.01669        0.643        0.709
##   578   527       2   0.672 0.01673        0.640        0.706
##   581   525       1   0.671 0.01675        0.639        0.705
##   583   524       1   0.670 0.01676        0.638        0.704
##   591   523       1   0.669 0.01678        0.637        0.702
##   593   522       2   0.666 0.01681        0.634        0.700
##   594   520       1   0.665 0.01683        0.633        0.699
##   599   519       1   0.663 0.01685        0.631        0.697
##   602   518       1   0.662 0.01686        0.630        0.696
##   604   517       1   0.661 0.01688        0.629        0.695
##   613   516       1   0.660 0.01689        0.627        0.694
##   615   515       1   0.658 0.01691        0.626        0.692
##   616   514       1   0.657 0.01693        0.625        0.691
##   617   513       1   0.656 0.01694        0.623        0.690
##   632   511       1   0.655 0.01696        0.622        0.689
##   636   510       1   0.653 0.01697        0.621        0.687
##   638   509       1   0.652 0.01699        0.620        0.686
##   653   508       1   0.651 0.01700        0.618        0.685
##   654   507       1   0.649 0.01702        0.617        0.684
##   657   506       1   0.648 0.01703        0.616        0.682
##   659   505       1   0.647 0.01705        0.614        0.681
##   663   504       2   0.644 0.01707        0.612        0.679
##   672   501       1   0.643 0.01709        0.610        0.677
##   675   500       1   0.642 0.01710        0.609        0.676
##   680   499       1   0.640 0.01712        0.608        0.675
##   683   498       1   0.639 0.01713        0.606        0.674
```

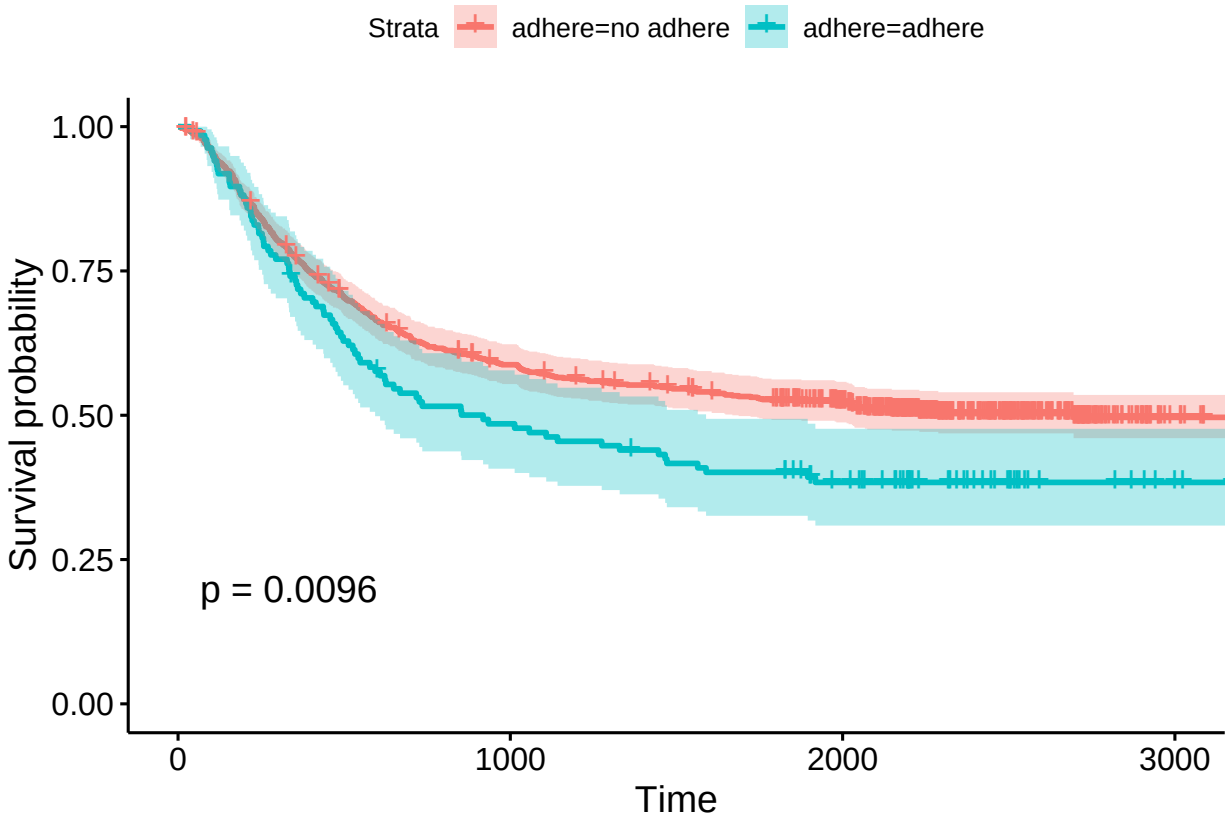
```
##   686    497       1    0.638 0.01714        0.605        0.672
##   697    496       1    0.637 0.01716        0.604        0.671
##   700    495       2    0.634 0.01718        0.601        0.669
##   701    493       1    0.633 0.01720        0.600        0.667
##   702    492       2    0.630 0.01722        0.597        0.665
##   711    490       1    0.629 0.01724        0.596        0.664
##   712    489       1    0.628 0.01725        0.595        0.662
##   730    488       1    0.626 0.01726        0.593        0.661
##   731    487       1    0.625 0.01727        0.592        0.660
##   739    486       1    0.624 0.01729        0.591        0.659
##   742    485       1    0.622 0.01730        0.589        0.657
##   748    484       1    0.621 0.01731        0.588        0.656
##   751    483       1    0.620 0.01732        0.587        0.655
##   752    482       1    0.619 0.01733        0.585        0.653
##   772    481       1    0.617 0.01735        0.584        0.652
##   774    480       1    0.616 0.01736        0.583        0.651
##   797    479       1    0.615 0.01737        0.582        0.650
##   803    478       1    0.613 0.01738        0.580        0.648
##   805    477       1    0.612 0.01739        0.579        0.647
##   827    476       1    0.611 0.01740        0.578        0.646
##   828    475       1    0.610 0.01741        0.576        0.645
##   835    474       1    0.608 0.01742        0.575        0.643
##   849    471       1    0.607 0.01743        0.574        0.642
##   855    470       1    0.606 0.01744        0.572        0.641
##   871    469       1    0.604 0.01746        0.571        0.640
##   883    468       1    0.603 0.01747        0.570        0.638
##   891    465       1    0.602 0.01748        0.568        0.637
##   900    464       1    0.600 0.01749        0.567        0.636
##   904    463       1    0.599 0.01750        0.566        0.634
##   912    462       1    0.598 0.01751        0.565        0.633
##   922    461       1    0.597 0.01752        0.563        0.632
##   930    460       1    0.595 0.01753        0.562        0.631
##   931    459       1    0.594 0.01754        0.561        0.629
##   936    458       1    0.593 0.01755        0.559        0.628
##   959    456       1    0.591 0.01756        0.558        0.627
##   960    455       1    0.590 0.01757        0.557        0.626
##   968    454       1    0.589 0.01757        0.555        0.624
##   975    453       1    0.588 0.01758        0.554        0.623
##  1020    452       1    0.586 0.01759        0.553        0.622
##  1024    451       1    0.585 0.01760        0.551        0.620
##  1025    450       1    0.584 0.01761        0.550        0.619
##  1026    449       1    0.582 0.01762        0.549        0.618
##  1029    448       1    0.581 0.01763        0.547        0.617
##  1032    447       1    0.580 0.01764        0.546        0.615
##  1037    446       1    0.578 0.01764        0.545        0.614
##  1042    445       1    0.577 0.01765        0.544        0.613
##  1052    444       1    0.576 0.01766        0.542        0.611
##  1057    443       1    0.575 0.01767        0.541        0.610
##  1081    442       1    0.573 0.01768        0.540        0.609
##  1089    441       1    0.572 0.01768        0.538        0.608
##  1106    439       1    0.571 0.01769        0.537        0.606
##  1114    438       1    0.569 0.01770        0.536        0.605
##  1122    437       1    0.568 0.01771        0.534        0.604
##  1130    436       1    0.567 0.01771        0.533        0.603
```

```
##  1139    435       1    0.565 0.01772        0.532        0.601
##  1159    434       1    0.564 0.01773        0.530        0.600
##  1183    433       1    0.563 0.01773        0.529        0.599
##  1211    431       1    0.561 0.01774        0.528        0.597
##  1233    430       1    0.560 0.01775        0.526        0.596
##  1236    429       1    0.559 0.01776        0.525        0.595
##  1274    428       1    0.558 0.01776        0.524        0.593
##  1277    427       1    0.556 0.01777        0.523        0.592
##  1298    425       1    0.555 0.01777        0.521        0.591
##  1323    423       1    0.554 0.01778        0.520        0.590
##  1353    422       1    0.552 0.01779        0.519        0.588
##  1432    420       1    0.551 0.01779        0.517        0.587
##  1436    419       1    0.550 0.01780        0.516        0.586
##  1455    418       1    0.548 0.01780        0.515        0.584
##  1475    416       1    0.547 0.01781        0.513        0.583
##  1488    415       1    0.546 0.01782        0.512        0.582
##  1535    414       1    0.544 0.01782        0.511        0.581
##  1539    412       1    0.543 0.01783        0.509        0.579
##  1551    409       1    0.542 0.01783        0.508        0.578
##  1561    408       1    0.540 0.01784        0.507        0.577
##  1606    407       2    0.538 0.01785        0.504        0.574
##  1644    404       1    0.536 0.01786        0.503        0.573
##  1647    403       1    0.535 0.01786        0.501        0.571
##  1668    402       1    0.534 0.01787        0.500        0.570
##  1687    401       1    0.532 0.01787        0.499        0.569
##  1723    400       1    0.531 0.01788        0.497        0.567
##  1743    399       1    0.530 0.01788        0.496        0.566
##  1749    398       1    0.528 0.01789        0.495        0.565
##  1759    397       1    0.527 0.01789        0.493        0.563
##  1786    396       1    0.526 0.01789        0.492        0.562
##  1876    376       1    0.524 0.01790        0.490        0.561
##  1976    363       1    0.523 0.01791        0.489        0.559
##  1981    359       1    0.522 0.01792        0.488        0.558
##  2012    347       1    0.520 0.01793        0.486        0.556
##  2018    346       1    0.519 0.01794        0.485        0.555
##  2028    342       1    0.517 0.01795        0.483        0.553
##  2031    339       1    0.515 0.01796        0.481        0.552
##  2035    338       1    0.514 0.01798        0.480        0.550
##  2036    337       1    0.512 0.01799        0.478        0.549
##  2067    329       1    0.511 0.01800        0.477        0.547
##  2074    326       1    0.509 0.01801        0.475        0.546
##  2148    290       1    0.508 0.01804        0.473        0.544
##  2231    236       1    0.505 0.01809        0.471        0.542
##  2288    208       1    0.503 0.01816        0.469        0.540
##  2695     76       1    0.496 0.01909        0.460        0.535
##
##                adhere=adhere
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##    36    135       1    0.993 0.00738        0.978        1.000
##    68    134       1    0.985 0.01040        0.965        1.000
##    80    133       1    0.978 0.01269        0.953        1.000
##    86    132       1    0.970 0.01459        0.942        0.999
##    88    131       1    0.963 0.01625        0.932        0.995
##   101    130       1    0.956 0.01774        0.921        0.991
```

```
##   105   129       1   0.948 0.01908       0.911       0.986
##   109   128       1   0.941 0.02032       0.902       0.981
##   116   127       1   0.933 0.02147       0.892       0.976
##   118   126       1   0.926 0.02254       0.883       0.971
##   121   125       1   0.919 0.02355       0.874       0.966
##   154   124       2   0.904 0.02539       0.855       0.955
##   157   122       1   0.896 0.02624       0.846       0.949
##   185   121       1   0.889 0.02705       0.837       0.944
##   189   120       1   0.881 0.02782       0.829       0.938
##   198   119       1   0.874 0.02855       0.820       0.932
##   204   118       1   0.867 0.02926       0.811       0.926
##   208   117       1   0.859 0.02993       0.803       0.920
##   218   116       1   0.852 0.03057       0.794       0.914
##   219   115       1   0.844 0.03119       0.785       0.908
##   223   114       1   0.837 0.03179       0.777       0.902
##   229   113       1   0.830 0.03236       0.769       0.896
##   242   112       1   0.822 0.03291       0.760       0.889
##   243   111       1   0.815 0.03343       0.752       0.883
##   253   110       1   0.807 0.03394       0.744       0.877
##   257   109       1   0.800 0.03443       0.735       0.870
##   258   108       1   0.793 0.03490       0.727       0.864
##   271   107       1   0.785 0.03535       0.719       0.858
##   279   106       1   0.778 0.03578       0.711       0.851
##   294   105       1   0.770 0.03620       0.703       0.845
##   328   104       1   0.763 0.03660       0.694       0.838
##   333   103       1   0.756 0.03699       0.686       0.832
##   334   102       1   0.748 0.03736       0.678       0.825
##   337   101       1   0.741 0.03772       0.670       0.818
##   352    99       1   0.733 0.03807       0.662       0.812
##   356    98       1   0.726 0.03841       0.654       0.805
##   360    97       1   0.718 0.03874       0.646       0.798
##   369    96       1   0.711 0.03905       0.638       0.792
##   380    95       1   0.703 0.03935       0.630       0.785
##   405    94       1   0.696 0.03963       0.622       0.778
##   415    93       1   0.688 0.03991       0.614       0.771
##   437    92       1   0.681 0.04017       0.607       0.764
##   439    91       1   0.673 0.04042       0.599       0.757
##   458    90       1   0.666 0.04066       0.591       0.751
##   465    89       1   0.658 0.04088       0.583       0.744
##   474    88       1   0.651 0.04110       0.575       0.737
##   480    87       1   0.643 0.04130       0.567       0.730
##   490    86       1   0.636 0.04149       0.560       0.723
##   497    85       1   0.629 0.04167       0.552       0.716
##   513    84       1   0.621 0.04184       0.544       0.709
##   526    83       1   0.614 0.04200       0.537       0.702
##   532    82       1   0.606 0.04215       0.529       0.695
##   542    81       1   0.599 0.04229       0.521       0.687
##   548    80       1   0.591 0.04242       0.514       0.680
##   577    79       1   0.584 0.04254       0.506       0.673
##   593    78       1   0.576 0.04264       0.498       0.666
##   608    76       1   0.569 0.04275       0.491       0.659
##   622    75       1   0.561 0.04285       0.483       0.652
##   625    74       1   0.553 0.04293       0.475       0.644
##   649    73       1   0.546 0.04301       0.468       0.637
```

```
##   668     72       1    0.538 0.04308        0.460        0.630
##   717     71       1    0.531 0.04313        0.453        0.622
##   726     70       1    0.523 0.04318        0.445        0.615
##   735     69       1    0.515 0.04321        0.437        0.608
##   851     68       1    0.508 0.04323        0.430        0.600
##   853     67       1    0.500 0.04325        0.422        0.593
##   918     66       1    0.493 0.04325        0.415        0.585
##   934     65       1    0.485 0.04325        0.407        0.578
##  1013     64       1    0.478 0.04323        0.400        0.570
##  1057     63       1    0.470 0.04320        0.393        0.563
##  1108     62       1    0.462 0.04317        0.385        0.555
##  1142     61       1    0.455 0.04312        0.378        0.548
##  1275     60       1    0.447 0.04306        0.370        0.540
##  1329     59       1    0.440 0.04299        0.363        0.533
##  1446     57       1    0.432 0.04293        0.356        0.525
##  1466     56       1    0.424 0.04285        0.348        0.517
##  1471     55       1    0.417 0.04276        0.341        0.509
##  1564     54       1    0.409 0.04266        0.333        0.502
##  1589     53       1    0.401 0.04254        0.326        0.494
##  1895     47       1    0.393 0.04248        0.318        0.485
##  1918     44       1    0.384 0.04245        0.309        0.477
```

```
ggsurvplot(km_fit, data = colon_subset_recurrence, pval = TRUE,conf.int = TRUE)
```




```
km_fit <- survfit(surv~1 + adhere + obstruct, data=colon_subset_recurrence)
summary(km_fit)
```

```
## Call: survfit(formula = surv ~ 1 + adhere + obstruct, data = colon_subset_recurrence)
##
```

```
##                adhere=no adhere, obstruct=no obstruct
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##     8    642       1    0.998 0.00156        0.995        1.000
##    28    640       1    0.997 0.00220        0.993        1.000
##    38    639       1    0.995 0.00269        0.990        1.000
##    43    638       1    0.994 0.00311        0.988        1.000
##    45    637       1    0.992 0.00347        0.985        0.999
##    49    636       1    0.991 0.00380        0.983        0.998
##    62    635       2    0.988 0.00438        0.979        0.996
##    63    633       1    0.986 0.00465        0.977        0.995
##    72    632       2    0.983 0.00513        0.973        0.993
##    77    630       1    0.981 0.00535        0.971        0.992
##    78    629       1    0.980 0.00557        0.969        0.991
##    79    628       1    0.978 0.00577        0.967        0.990
##    80    627       1    0.977 0.00597        0.965        0.988
##    85    626       2    0.973 0.00635        0.961        0.986
##    86    624       1    0.972 0.00652        0.959        0.985
##    91    623       2    0.969 0.00687        0.955        0.982
##    94    621       1    0.967 0.00703        0.954        0.981
##    98    620       2    0.964 0.00735        0.950        0.979
##   100    618       1    0.963 0.00750        0.948        0.977
##   102    617       1    0.961 0.00765        0.946        0.976
##   106    616       1    0.959 0.00779        0.944        0.975
##   108    615       1    0.958 0.00793        0.942        0.974
##   113    614       3    0.953 0.00834        0.937        0.970
##   116    611       1    0.952 0.00847        0.935        0.968
##   119    610       1    0.950 0.00860        0.933        0.967
##   122    609       1    0.949 0.00873        0.932        0.966
##   127    608       1    0.947 0.00885        0.930        0.964
##   131    607       1    0.945 0.00897        0.928        0.963
##   132    606       1    0.944 0.00909        0.926        0.962
##   136    605       1    0.942 0.00921        0.924        0.961
##   139    604       1    0.941 0.00933        0.923        0.959
##   141    603       1    0.939 0.00944        0.921        0.958
##   143    602       1    0.938 0.00955        0.919        0.957
##   145    601       1    0.936 0.00966        0.917        0.955
##   146    600       2    0.933 0.00988        0.914        0.952
##   147    598       1    0.931 0.00999        0.912        0.951
##   157    597       1    0.930 0.01009        0.910        0.950
##   161    596       1    0.928 0.01019        0.908        0.948
##   165    595       3    0.924 0.01049        0.903        0.944
##   166    592       1    0.922 0.01059        0.901        0.943
##   167    591       1    0.920 0.01069        0.900        0.942
##   169    590       1    0.919 0.01078        0.898        0.940
##   173    589       3    0.914 0.01106        0.893        0.936
##   174    586       2    0.911 0.01124        0.889        0.933
##   176    584       2    0.908 0.01142        0.886        0.931
##   179    582       1    0.906 0.01150        0.884        0.929
##   181    581       1    0.905 0.01159        0.882        0.928
##   183    580       2    0.902 0.01176        0.879        0.925
##   185    578       2    0.899 0.01192        0.876        0.922
##   186    576       1    0.897 0.01200        0.874        0.921
##   189    575       1    0.895 0.01208        0.872        0.919
##   191    574       2    0.892 0.01224        0.869        0.917
```

```
##   196   572       1   0.891 0.01232        0.867        0.915
##   201   571       1   0.889 0.01240        0.865        0.914
##   203   570       1   0.888 0.01247        0.864        0.912
##   205   569       1   0.886 0.01255        0.862        0.911
##   208   568       1   0.885 0.01262        0.860        0.910
##   215   567       2   0.881 0.01277        0.857        0.907
##   216   565       1   0.880 0.01284        0.855        0.905
##   221   563       1   0.878 0.01291        0.853        0.904
##   224   562       1   0.877 0.01298        0.852        0.903
##   227   561       1   0.875 0.01305        0.850        0.901
##   229   560       1   0.874 0.01312        0.848        0.900
##   230   559       3   0.869 0.01333        0.843        0.895
##   235   556       1   0.867 0.01340        0.842        0.894
##   237   555       2   0.864 0.01353        0.838        0.891
##   238   553       1   0.863 0.01360        0.836        0.890
##   246   552       1   0.861 0.01366        0.835        0.888
##   248   551       1   0.860 0.01373        0.833        0.887
##   250   550       1   0.858 0.01379        0.831        0.885
##   252   549       1   0.856 0.01385        0.830        0.884
##   256   548       2   0.853 0.01398        0.826        0.881
##   260   546       1   0.852 0.01404        0.825        0.880
##   261   545       1   0.850 0.01410        0.823        0.878
##   262   544       1   0.849 0.01416        0.821        0.877
##   263   543       2   0.845 0.01428        0.818        0.874
##   264   541       1   0.844 0.01434        0.816        0.873
##   273   540       1   0.842 0.01440        0.815        0.871
##   274   539       1   0.841 0.01445        0.813        0.870
##   276   538       1   0.839 0.01451        0.811        0.868
##   279   537       1   0.838 0.01457        0.810        0.867
##   285   536       1   0.836 0.01462        0.808        0.865
##   286   535       2   0.833 0.01474        0.805        0.862
##   290   533       1   0.831 0.01479        0.803        0.861
##   291   532       1   0.830 0.01485        0.801        0.859
##   294   531       1   0.828 0.01490        0.800        0.858
##   296   530       2   0.825 0.01501        0.796        0.855
##   303   528       1   0.824 0.01506        0.795        0.854
##   304   527       1   0.822 0.01511        0.793        0.852
##   308   526       1   0.820 0.01516        0.791        0.851
##   313   525       1   0.819 0.01521        0.790        0.849
##   315   524       2   0.816 0.01532        0.786        0.846
##   322   522       2   0.813 0.01542        0.783        0.843
##   325   520       1   0.811 0.01547        0.781        0.842
##   329   519       1   0.810 0.01551        0.780        0.841
##   330   518       2   0.806 0.01561        0.776        0.838
##   336   516       2   0.803 0.01571        0.773        0.835
##   337   514       1   0.802 0.01575        0.771        0.833
##   341   513       1   0.800 0.01580        0.770        0.832
##   344   512       1   0.799 0.01585        0.768        0.830
##   348   511       2   0.795 0.01594        0.765        0.827
##   349   509       1   0.794 0.01598        0.763        0.826
##   352   508       1   0.792 0.01603        0.762        0.824
##   356   506       1   0.791 0.01607        0.760        0.823
##   360   505       1   0.789 0.01612        0.758        0.821
##   362   504       1   0.788 0.01616        0.757        0.820
```

```
##   365   503       1   0.786 0.01620        0.755        0.819
##   370   502       1   0.785 0.01625        0.753        0.817
##   372   501       1   0.783 0.01629        0.752        0.816
##   374   500       1   0.781 0.01633        0.750        0.814
##   378   499       1   0.780 0.01637        0.748        0.813
##   379   498       1   0.778 0.01642        0.747        0.811
##   380   497       1   0.777 0.01646        0.745        0.810
##   384   496       1   0.775 0.01650        0.743        0.808
##   386   495       1   0.774 0.01654        0.742        0.807
##   392   494       1   0.772 0.01658        0.740        0.805
##   393   493       1   0.770 0.01662        0.739        0.804
##   398   492       1   0.769 0.01666        0.737        0.802
##   401   491       1   0.767 0.01670        0.735        0.801
##   402   490       1   0.766 0.01674        0.734        0.799
##   406   489       1   0.764 0.01678        0.732        0.798
##   408   488       1   0.763 0.01682        0.730        0.796
##   415   487       1   0.761 0.01685        0.729        0.795
##   429   485       1   0.759 0.01689        0.727        0.793
##   431   484       1   0.758 0.01693        0.725        0.792
##   433   483       1   0.756 0.01697        0.724        0.790
##   434   482       1   0.755 0.01701        0.722        0.789
##   435   481       1   0.753 0.01704        0.721        0.787
##   438   480       1   0.752 0.01708        0.719        0.786
##   440   479       1   0.750 0.01712        0.717        0.784
##   443   478       1   0.748 0.01715        0.716        0.783
##   448   477       1   0.747 0.01719        0.714        0.781
##   454   475       2   0.744 0.01726        0.711        0.778
##   458   473       1   0.742 0.01729        0.709        0.777
##   461   472       1   0.741 0.01733        0.707        0.775
##   466   471       2   0.737 0.01740        0.704        0.772
##   482   469       1   0.736 0.01743        0.703        0.771
##   485   468       1   0.734 0.01746        0.701        0.769
##   491   466       2   0.731 0.01753        0.698        0.766
##   495   464       1   0.730 0.01756        0.696        0.765
##   496   463       1   0.728 0.01760        0.694        0.763
##   498   462       1   0.726 0.01763        0.693        0.762
##   499   461       1   0.725 0.01766        0.691        0.760
##   505   460       1   0.723 0.01769        0.689        0.759
##   510   459       1   0.722 0.01772        0.688        0.757
##   511   458       1   0.720 0.01775        0.686        0.756
##   523   457       1   0.719 0.01779        0.685        0.754
##   525   456       1   0.717 0.01782        0.683        0.753
##   532   455       1   0.715 0.01785        0.681        0.751
##   534   454       1   0.714 0.01788        0.680        0.750
##   536   453       1   0.712 0.01791        0.678        0.748
##   540   452       1   0.711 0.01794        0.676        0.747
##   543   451       2   0.708 0.01799        0.673        0.744
##   547   449       1   0.706 0.01802        0.672        0.742
##   554   448       1   0.704 0.01805        0.670        0.741
##   555   447       1   0.703 0.01808        0.668        0.739
##   560   446       1   0.701 0.01811        0.667        0.738
##   565   445       1   0.700 0.01814        0.665        0.736
##   573   444       2   0.697 0.01819        0.662        0.733
##   578   442       2   0.693 0.01824        0.659        0.730
```

```
##   583    440       1    0.692 0.01827       0.657       0.729
##   591    439       1    0.690 0.01830       0.655       0.727
##   593    438       2    0.687 0.01835       0.652       0.724
##   594    436       1    0.685 0.01837       0.650       0.722
##   599    435       1    0.684 0.01840       0.649       0.721
##   602    434       1    0.682 0.01842       0.647       0.719
##   613    433       1    0.681 0.01845       0.646       0.718
##   615    432       1    0.679 0.01847       0.644       0.716
##   616    431       1    0.678 0.01850       0.642       0.715
##   617    430       1    0.676 0.01852       0.641       0.713
##   632    428       1    0.674 0.01855       0.639       0.712
##   636    427       1    0.673 0.01857       0.637       0.710
##   638    426       1    0.671 0.01859       0.636       0.709
##   654    425       1    0.670 0.01862       0.634       0.707
##   657    424       1    0.668 0.01864       0.633       0.706
##   659    423       1    0.667 0.01866       0.631       0.704
##   663    422       2    0.663 0.01871       0.628       0.701
##   672    419       1    0.662 0.01873       0.626       0.700
##   675    418       1    0.660 0.01875       0.624       0.698
##   680    417       1    0.659 0.01877       0.623       0.696
##   683    416       1    0.657 0.01879       0.621       0.695
##   686    415       1    0.655 0.01882       0.620       0.693
##   697    414       1    0.654 0.01884       0.618       0.692
##   700    413       2    0.651 0.01888       0.615       0.689
##   701    411       1    0.649 0.01890       0.613       0.687
##   702    410       2    0.646 0.01894       0.610       0.684
##   711    408       1    0.644 0.01896       0.608       0.683
##   712    407       1    0.643 0.01898       0.607       0.681
##   730    406       1    0.641 0.01900       0.605       0.680
##   731    405       1    0.640 0.01902       0.603       0.678
##   739    404       1    0.638 0.01903       0.602       0.676
##   742    403       1    0.636 0.01905       0.600       0.675
##   748    402       1    0.635 0.01907       0.599       0.673
##   751    401       1    0.633 0.01909       0.597       0.672
##   752    400       1    0.632 0.01911       0.595       0.670
##   774    399       1    0.630 0.01912       0.594       0.669
##   803    398       1    0.629 0.01914       0.592       0.667
##   805    397       1    0.627 0.01916       0.591       0.666
##   827    396       1    0.625 0.01918       0.589       0.664
##   835    395       1    0.624 0.01919       0.587       0.663
##   849    392       1    0.622 0.01921       0.586       0.661
##   855    391       1    0.621 0.01923       0.584       0.659
##   883    390       1    0.619 0.01924       0.582       0.658
##   891    387       1    0.617 0.01926       0.581       0.656
##   900    386       1    0.616 0.01928       0.579       0.655
##   904    385       1    0.614 0.01929       0.578       0.653
##   922    384       1    0.613 0.01931       0.576       0.652
##   930    383       1    0.611 0.01932       0.574       0.650
##   931    382       1    0.609 0.01934       0.573       0.649
##   936    381       1    0.608 0.01935       0.571       0.647
##   959    379       1    0.606 0.01937       0.569       0.645
##   968    378       1    0.605 0.01938       0.568       0.644
##   975    377       1    0.603 0.01940       0.566       0.642
##  1020    376       1    0.601 0.01941       0.565       0.641
```

```
##  1024    375       1    0.600 0.01943        0.563        0.639
##  1025    374       1    0.598 0.01944        0.561        0.638
##  1029    373       1    0.597 0.01946        0.560        0.636
##  1032    372       1    0.595 0.01947        0.558        0.634
##  1037    371       1    0.593 0.01948        0.556        0.633
##  1042    370       1    0.592 0.01950        0.555        0.631
##  1052    369       1    0.590 0.01951        0.553        0.630
##  1057    368       1    0.589 0.01952        0.552        0.628
##  1081    367       1    0.587 0.01954        0.550        0.627
##  1089    366       1    0.585 0.01955        0.548        0.625
##  1106    364       1    0.584 0.01956        0.547        0.623
##  1114    363       1    0.582 0.01957        0.545        0.622
##  1122    362       1    0.581 0.01958        0.543        0.620
##  1130    361       1    0.579 0.01960        0.542        0.619
##  1139    360       1    0.577 0.01961        0.540        0.617
##  1159    359       1    0.576 0.01962        0.539        0.616
##  1183    358       1    0.574 0.01963        0.537        0.614
##  1233    356       1    0.573 0.01964        0.535        0.612
##  1236    355       1    0.571 0.01965        0.534        0.611
##  1274    354       1    0.569 0.01966        0.532        0.609
##  1277    353       1    0.568 0.01967        0.530        0.608
##  1298    351       1    0.566 0.01968        0.529        0.606
##  1323    349       1    0.564 0.01969        0.527        0.604
##  1353    348       1    0.563 0.01970        0.525        0.603
##  1432    346       1    0.561 0.01971        0.524        0.601
##  1436    345       1    0.560 0.01972        0.522        0.600
##  1455    344       1    0.558 0.01973        0.521        0.598
##  1475    342       1    0.556 0.01974        0.519        0.596
##  1488    341       1    0.555 0.01975        0.517        0.595
##  1535    340       1    0.553 0.01976        0.516        0.593
##  1539    338       1    0.551 0.01977        0.514        0.592
##  1551    335       1    0.550 0.01978        0.512        0.590
##  1561    334       1    0.548 0.01979        0.511        0.588
##  1606    333       2    0.545 0.01981        0.507        0.585
##  1644    331       1    0.543 0.01981        0.506        0.583
##  1647    330       1    0.542 0.01982        0.504        0.582
##  1668    329       1    0.540 0.01983        0.502        0.580
##  1687    328       1    0.538 0.01984        0.501        0.579
##  1723    327       1    0.537 0.01985        0.499        0.577
##  1749    326       1    0.535 0.01985        0.497        0.575
##  1759    325       1    0.533 0.01986        0.496        0.574
##  1786    324       1    0.532 0.01987        0.494        0.572
##  1976    298       1    0.530 0.01988        0.492        0.570
##  1981    295       1    0.528 0.01989        0.490        0.569
##  2028    283       1    0.526 0.01991        0.489        0.567
##  2035    280       1    0.524 0.01993        0.487        0.565
##  2067    272       1    0.522 0.01995        0.485        0.563
##  2074    270       1    0.520 0.01997        0.483        0.561
##  2148    245       1    0.518 0.02000        0.481        0.559
##  2288    179       1    0.515 0.02010        0.478        0.556
##  2695     63       1    0.507 0.02138        0.467        0.551
##
##                 adhere=no adhere, obstruct=obstruct
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
```

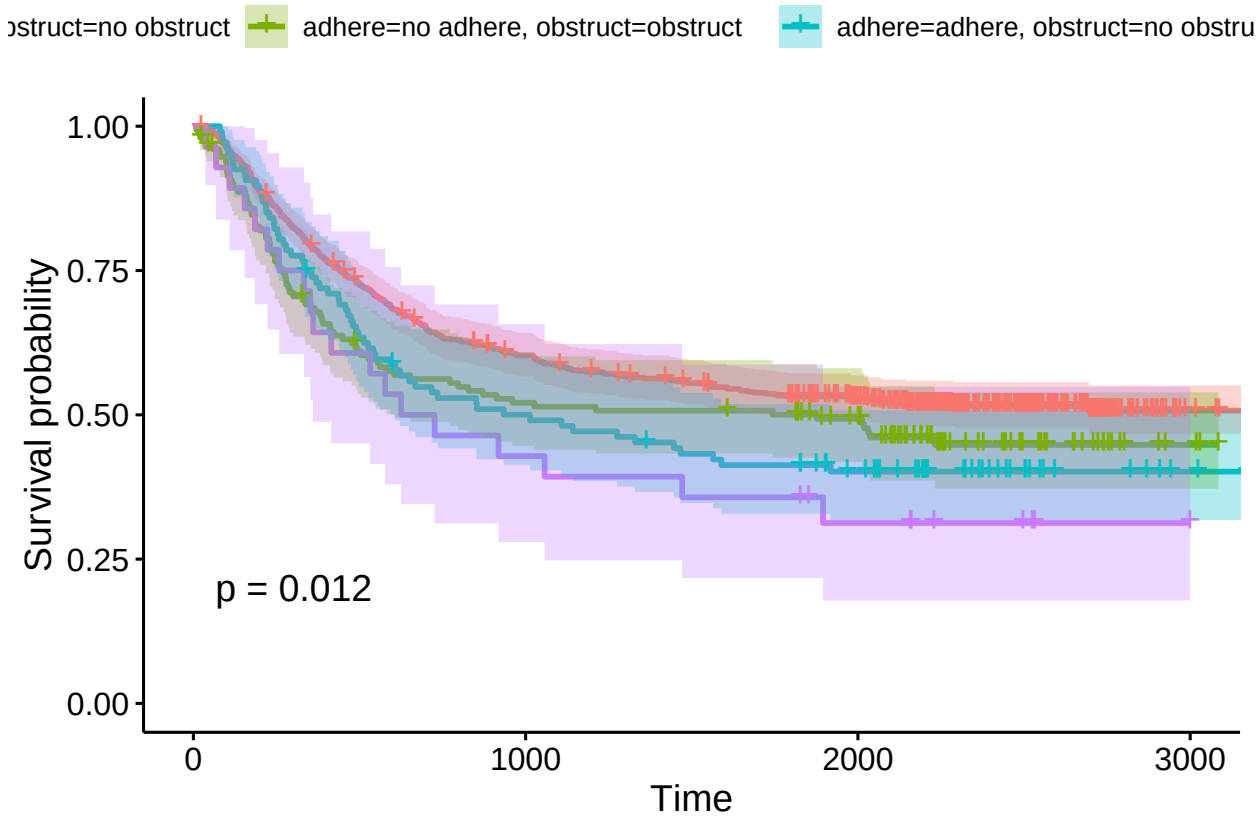
```
##     9    152       1    0.993 0.00656        0.981        1.000
##    19    151       1    0.987 0.00924        0.969        1.000
##    20    150       1    0.980 0.01128        0.958        1.000
##    35    148       1    0.974 0.01301        0.948        0.999
##    40    147       1    0.967 0.01451        0.939        0.996
##    59    144       1    0.960 0.01588        0.930        0.992
##    77    143       1    0.954 0.01713        0.921        0.988
##    80    142       1    0.947 0.01828        0.912        0.983
##    98    141       1    0.940 0.01935        0.903        0.979
##    99    140       2    0.927 0.02127        0.886        0.969
##   101    138       1    0.920 0.02215        0.878        0.964
##   103    137       1    0.913 0.02299        0.869        0.959
##   111    136       1    0.907 0.02378        0.861        0.954
##   116    135       1    0.900 0.02453        0.853        0.949
##   121    134       1    0.893 0.02525        0.845        0.944
##   134    133       1    0.886 0.02594        0.837        0.939
##   157    132       1    0.880 0.02660        0.829        0.933
##   160    131       1    0.873 0.02723        0.821        0.928
##   161    130       1    0.866 0.02784        0.813        0.923
##   168    129       1    0.860 0.02842        0.806        0.917
##   174    128       1    0.853 0.02898        0.798        0.912
##   175    127       1    0.846 0.02952        0.790        0.906
##   185    126       2    0.833 0.03054        0.775        0.895
##   188    124       1    0.826 0.03102        0.767        0.889
##   199    123       1    0.819 0.03149        0.760        0.883
##   218    122       2    0.806 0.03237        0.745        0.872
##   228    120       1    0.799 0.03279        0.737        0.866
##   230    119       2    0.786 0.03359        0.723        0.854
##   238    117       1    0.779 0.03397        0.715        0.848
##   245    116       2    0.766 0.03468        0.701        0.837
##   255    114       1    0.759 0.03502        0.693        0.831
##   260    113       1    0.752 0.03535        0.686        0.825
##   271    112       1    0.745 0.03567        0.679        0.819
##   276    111       1    0.739 0.03597        0.671        0.813
##   279    110       1    0.732 0.03627        0.664        0.807
##   280    109       1    0.725 0.03655        0.657        0.801
##   286    108       1    0.719 0.03682        0.650        0.794
##   290    107       1    0.712 0.03709        0.643        0.788
##   300    106       1    0.705 0.03734        0.636        0.782
##   335    104       1    0.698 0.03759        0.628        0.776
##   337    103       1    0.692 0.03783        0.621        0.770
##   354    102       1    0.685 0.03807        0.614        0.764
##   366    101       1    0.678 0.03829        0.607        0.757
##   382    100       1    0.671 0.03850        0.600        0.751
##   386     99       1    0.664 0.03870        0.593        0.745
##   389     98       1    0.658 0.03890        0.586        0.738
##   411     97       1    0.651 0.03908        0.579        0.732
##   413     96       1    0.644 0.03926        0.572        0.726
##   422     95       1    0.637 0.03943        0.565        0.719
##   449     94       1    0.631 0.03959        0.558        0.713
##   476     93       1    0.624 0.03974        0.551        0.707
##   489     91       1    0.617 0.03989        0.543        0.700
##   493     90       1    0.610 0.04003        0.536        0.694
##   504     89       1    0.603 0.04016        0.529        0.687
```

```
##   527     88       1    0.596 0.04029        0.522        0.681
##   554     87       1    0.589 0.04040        0.515        0.674
##   561     86       1    0.583 0.04051        0.508        0.668
##   581     85       1    0.576 0.04061        0.501        0.661
##   604     84       1    0.569 0.04070        0.494        0.655
##   653     83       1    0.562 0.04078        0.488        0.648
##   772     82       1    0.555 0.04086        0.481        0.641
##   797     81       1    0.548 0.04092        0.474        0.635
##   828     80       1    0.542 0.04098        0.467        0.628
##   871     79       1    0.535 0.04103        0.460        0.621
##   912     78       1    0.528 0.04108        0.453        0.615
##   960     77       1    0.521 0.04111        0.446        0.608
##  1026     76       1    0.514 0.04114        0.439        0.601
##  1211     75       1    0.507 0.04115        0.433        0.595
##  1743     73       1    0.500 0.04117        0.426        0.588
##  1876     68       1    0.493 0.04122        0.418        0.581
##  2012     61       1    0.485 0.04133        0.410        0.573
##  2018     60       1    0.477 0.04142        0.402        0.565
##  2031     59       1    0.469 0.04150        0.394        0.558
##  2036     58       1    0.461 0.04156        0.386        0.550
##  2231     36       1    0.448 0.04233        0.372        0.539
##
##                adhere=adhere, obstruct=no obstruct
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##    80    107       1    0.991  0.0093        0.973        1.000
##    86    106       1    0.981  0.0131        0.956        1.000
##    88    105       1    0.972  0.0160        0.941        1.000
##   101    104       1    0.963  0.0183        0.927        0.999
##   105    103       1    0.953  0.0204        0.914        0.994
##   116    102       1    0.944  0.0222        0.901        0.989
##   118    101       1    0.935  0.0239        0.889        0.983
##   121    100       1    0.925  0.0254        0.877        0.976
##   154     99       1    0.916  0.0268        0.865        0.970
##   157     98       1    0.907  0.0281        0.853        0.963
##   189     97       1    0.897  0.0294        0.841        0.957
##   198     96       1    0.888  0.0305        0.830        0.950
##   204     95       1    0.879  0.0316        0.819        0.943
##   208     94       1    0.869  0.0326        0.808        0.935
##   218     93       1    0.860  0.0336        0.796        0.928
##   219     92       1    0.850  0.0345        0.786        0.921
##   229     91       1    0.841  0.0353        0.775        0.913
##   242     90       1    0.832  0.0362        0.764        0.906
##   243     89       1    0.822  0.0369        0.753        0.898
##   253     88       1    0.813  0.0377        0.742        0.890
##   257     87       1    0.804  0.0384        0.732        0.883
##   271     86       1    0.794  0.0391        0.721        0.875
##   279     85       1    0.785  0.0397        0.711        0.867
##   294     84       1    0.776  0.0403        0.701        0.859
##   328     83       1    0.766  0.0409        0.690        0.851
##   334     82       1    0.757  0.0415        0.680        0.843
##   337     81       1    0.748  0.0420        0.670        0.835
##   356     79       1    0.738  0.0425        0.659        0.826
##   369     78       1    0.729  0.0430        0.649        0.818
##   380     77       1    0.719  0.0435        0.639        0.810
```

```
##   405     76       1    0.710  0.0439        0.629        0.801
##   437     75       1    0.700  0.0443        0.619        0.793
##   439     74       1    0.691  0.0447        0.609        0.784
##   458     73       1    0.681  0.0451        0.598        0.776
##   465     72       1    0.672  0.0455        0.588        0.767
##   474     71       1    0.662  0.0458        0.579        0.759
##   480     70       1    0.653  0.0461        0.569        0.750
##   490     69       1    0.644  0.0464        0.559        0.741
##   497     68       1    0.634  0.0467        0.549        0.733
##   513     67       1    0.625  0.0469        0.539        0.724
##   526     66       1    0.615  0.0472        0.529        0.715
##   542     65       1    0.606  0.0474        0.520        0.706
##   548     64       1    0.596  0.0476        0.510        0.697
##   593     63       1    0.587  0.0478        0.500        0.688
##   608     61       1    0.577  0.0479        0.490        0.679
##   622     60       1    0.568  0.0481        0.481        0.670
##   649     59       1    0.558  0.0482        0.471        0.661
##   668     58       1    0.548  0.0483        0.461        0.652
##   717     57       1    0.539  0.0484        0.452        0.643
##   735     56       1    0.529  0.0485        0.442        0.633
##   851     55       1    0.519  0.0486        0.432        0.624
##   853     54       1    0.510  0.0486        0.423        0.615
##   934     53       1    0.500  0.0487        0.413        0.605
##  1013     52       1    0.491  0.0487        0.404        0.596
##  1108     51       1    0.481  0.0486        0.394        0.586
##  1142     50       1    0.471  0.0486        0.385        0.577
##  1275     49       1    0.462  0.0486        0.376        0.567
##  1329     48       1    0.452  0.0485        0.366        0.558
##  1446     46       1    0.442  0.0484        0.357        0.548
##  1466     45       1    0.432  0.0483        0.347        0.538
##  1564     44       1    0.423  0.0482        0.338        0.529
##  1589     43       1    0.413  0.0481        0.329        0.519
##  1918     37       1    0.402  0.0481        0.318        0.508
##
##                adhere=adhere, obstruct=obstruct
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##    36     28       1    0.964  0.0351        0.898        1.000
##    68     27       1    0.929  0.0487        0.838        1.000
##   109     26       1    0.893  0.0585        0.785        1.000
##   154     25       1    0.857  0.0661        0.737        0.997
##   185     24       1    0.821  0.0724        0.691        0.976
##   223     23       1    0.786  0.0775        0.648        0.953
##   258     22       1    0.750  0.0818        0.606        0.929
##   333     21       1    0.714  0.0854        0.565        0.903
##   352     20       1    0.679  0.0883        0.526        0.876
##   360     19       1    0.643  0.0906        0.488        0.847
##   415     18       1    0.607  0.0923        0.451        0.818
##   532     17       1    0.571  0.0935        0.415        0.788
##   577     16       1    0.536  0.0942        0.379        0.756
##   625     15       1    0.500  0.0945        0.345        0.724
##   726     14       1    0.464  0.0942        0.312        0.691
##   918     13       1    0.429  0.0935        0.279        0.657
##  1057     12       1    0.393  0.0923        0.248        0.623
##  1471     11       1    0.357  0.0906        0.217        0.587
```

```
##  1895       8       1    0.312  0.0896        0.178        0.548
```

```
ggsurvplot(km_fit, data = colon_subset_recurrence, pval = TRUE,
           conf.int = TRUE)
```




```
km_fit <- survfit(surv~1 + nodes.ds + obstruct, data=colon_subset_recurrence)
summary(km_fit)
```

```
## Call: survfit(formula = surv ~ 1 + nodes.ds + obstruct, data = colon_subset_recurrence)
##
## 18 observations deleted due to missingness
##                 nodes.ds=<3, obstruct=no obstruct
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##    62    478       2    0.996 0.00295        0.990        1.000
##    72    476       1    0.994 0.00361        0.987        1.000
##    86    475       1    0.992 0.00417        0.983        1.000
##   102    474       1    0.990 0.00465        0.980        0.999
##   113    473       1    0.987 0.00509        0.978        0.997
##   116    472       2    0.983 0.00587        0.972        0.995
##   118    470       1    0.981 0.00622        0.969        0.993
##   119    469       1    0.979 0.00655        0.966        0.992
##   131    468       1    0.977 0.00686        0.964        0.991
##   139    467       1    0.975 0.00716        0.961        0.989
##   141    466       1    0.973 0.00744        0.958        0.987
##   143    465       1    0.971 0.00771        0.956        0.986
##   154    464       1    0.969 0.00797        0.953        0.984
##   157    463       2    0.964 0.00847        0.948        0.981
##   165    461       2    0.960 0.00894        0.943        0.978
##   167    459       1    0.958 0.00916        0.940        0.976
```

```
##   169    458       1    0.956 0.00937        0.938        0.975
##   174    457       1    0.954 0.00958        0.935        0.973
##   176    456       1    0.952 0.00979        0.933        0.971
##   179    455       1    0.950 0.00999        0.930        0.970
##   181    454       1    0.948 0.01018        0.928        0.968
##   183    453       1    0.946 0.01037        0.925        0.966
##   189    452       2    0.941 0.01074        0.921        0.963
##   191    450       2    0.937 0.01109        0.916        0.959
##   196    448       1    0.935 0.01126        0.913        0.957
##   205    447       1    0.933 0.01143        0.911        0.956
##   215    446       1    0.931 0.01160        0.909        0.954
##   224    444       1    0.929 0.01176        0.906        0.952
##   227    443       1    0.927 0.01192        0.904        0.950
##   238    442       1    0.925 0.01207        0.901        0.949
##   243    441       1    0.923 0.01223        0.899        0.947
##   248    440       1    0.920 0.01238        0.897        0.945
##   250    439       1    0.918 0.01252        0.894        0.943
##   252    438       1    0.916 0.01267        0.892        0.941
##   256    437       1    0.914 0.01281        0.889        0.940
##   262    436       1    0.912 0.01295        0.887        0.938
##   263    435       1    0.910 0.01309        0.885        0.936
##   264    434       1    0.908 0.01323        0.882        0.934
##   271    433       1    0.906 0.01336        0.880        0.932
##   276    432       1    0.904 0.01350        0.878        0.931
##   285    431       1    0.902 0.01363        0.875        0.929
##   290    430       1    0.900 0.01376        0.873        0.927
##   291    429       1    0.897 0.01388        0.871        0.925
##   294    428       1    0.895 0.01401        0.868        0.923
##   296    427       1    0.893 0.01413        0.866        0.921
##   303    426       1    0.891 0.01425        0.864        0.920
##   308    425       1    0.889 0.01437        0.861        0.918
##   315    424       1    0.887 0.01449        0.859        0.916
##   325    423       1    0.885 0.01461        0.857        0.914
##   329    422       1    0.883 0.01472        0.854        0.912
##   330    421       2    0.879 0.01495        0.850        0.908
##   336    419       2    0.874 0.01517        0.845        0.905
##   337    417       1    0.872 0.01528        0.843        0.903
##   352    415       1    0.870 0.01538        0.841        0.901
##   356    413       2    0.866 0.01559        0.836        0.897
##   369    411       1    0.864 0.01570        0.834        0.895
##   379    410       1    0.862 0.01580        0.831        0.893
##   380    409       2    0.858 0.01600        0.827        0.889
##   392    407       1    0.855 0.01610        0.824        0.888
##   401    406       1    0.853 0.01620        0.822        0.886
##   402    405       1    0.851 0.01630        0.820        0.884
##   405    404       1    0.849 0.01639        0.818        0.882
##   406    403       1    0.847 0.01648        0.815        0.880
##   431    402       1    0.845 0.01658        0.813        0.878
##   433    401       1    0.843 0.01667        0.811        0.876
##   437    400       1    0.841 0.01676        0.808        0.874
##   440    399       1    0.839 0.01685        0.806        0.872
##   448    398       1    0.836 0.01694        0.804        0.870
##   461    397       1    0.834 0.01703        0.802        0.868
##   465    396       1    0.832 0.01711        0.799        0.866
```

```
##   466     395       1    0.830 0.01720        0.797        0.865
##   474     394       1    0.828 0.01728        0.795        0.863
##   480     393       1    0.826 0.01737        0.793        0.861
##   485     392       1    0.824 0.01745        0.790        0.859
##   497     390       1    0.822 0.01753        0.788        0.857
##   499     389       1    0.820 0.01762        0.786        0.855
##   510     388       1    0.817 0.01770        0.784        0.853
##   511     387       1    0.815 0.01778        0.781        0.851
##   513     386       1    0.813 0.01786        0.779        0.849
##   525     385       1    0.811 0.01793        0.777        0.847
##   526     384       1    0.809 0.01801        0.774        0.845
##   534     383       1    0.807 0.01809        0.772        0.843
##   536     382       1    0.805 0.01816        0.770        0.841
##   540     381       1    0.803 0.01824        0.768        0.839
##   543     380       2    0.798 0.01839        0.763        0.835
##   548     378       1    0.796 0.01846        0.761        0.833
##   555     377       1    0.794 0.01853        0.759        0.831
##   560     376       1    0.792 0.01860        0.756        0.829
##   573     375       2    0.788 0.01874        0.752        0.825
##   578     373       1    0.786 0.01881        0.750        0.824
##   591     372       1    0.784 0.01887        0.748        0.822
##   593     371       3    0.777 0.01907        0.741        0.816
##   594     368       1    0.775 0.01914        0.739        0.814
##   599     367       1    0.773 0.01920        0.736        0.812
##   616     365       1    0.771 0.01927        0.734        0.810
##   622     364       1    0.769 0.01933        0.732        0.808
##   632     363       1    0.767 0.01939        0.730        0.806
##   636     362       1    0.765 0.01945        0.727        0.804
##   638     361       1    0.763 0.01951        0.725        0.802
##   649     360       1    0.760 0.01958        0.723        0.800
##   654     359       1    0.758 0.01963        0.721        0.798
##   657     358       1    0.756 0.01969        0.719        0.796
##   668     356       1    0.754 0.01975        0.716        0.794
##   680     355       1    0.752 0.01981        0.714        0.792
##   683     354       1    0.750 0.01987        0.712        0.790
##   686     353       1    0.748 0.01993        0.710        0.788
##   702     352       2    0.743 0.02004        0.705        0.784
##   711     350       1    0.741 0.02009        0.703        0.782
##   712     349       1    0.739 0.02015        0.701        0.780
##   717     348       1    0.737 0.02020        0.698        0.778
##   730     347       1    0.735 0.02025        0.696        0.776
##   731     346       1    0.733 0.02031        0.694        0.774
##   739     345       1    0.731 0.02036        0.692        0.772
##   742     344       1    0.729 0.02041        0.690        0.770
##   748     343       1    0.726 0.02046        0.687        0.768
##   751     342       1    0.724 0.02051        0.685        0.766
##   774     341       1    0.722 0.02056        0.683        0.764
##   803     340       1    0.720 0.02061        0.681        0.762
##   805     339       1    0.718 0.02066        0.679        0.760
##   827     338       1    0.716 0.02071        0.676        0.758
##   835     337       1    0.714 0.02075        0.674        0.756
##   849     335       1    0.712 0.02080        0.672        0.754
##   851     334       1    0.709 0.02085        0.670        0.751
##   853     333       1    0.707 0.02089        0.668        0.749
```

```
##   855    332       1    0.705 0.02094        0.665        0.747
##   883    331       1    0.703 0.02098        0.663        0.745
##   922    329       1    0.701 0.02103        0.661        0.743
##   930    328       1    0.699 0.02107        0.659        0.741
##   931    327       1    0.697 0.02111        0.656        0.739
##   934    326       1    0.694 0.02116        0.654        0.737
##   936    325       1    0.692 0.02120        0.652        0.735
##   959    323       1    0.690 0.02124        0.650        0.733
##   975    322       1    0.688 0.02128        0.648        0.731
##  1013    321       1    0.686 0.02133        0.645        0.729
##  1020    320       1    0.684 0.02137        0.643        0.727
##  1024    319       1    0.682 0.02141        0.641        0.725
##  1025    318       1    0.679 0.02145        0.639        0.723
##  1029    317       1    0.677 0.02149        0.637        0.721
##  1032    316       1    0.675 0.02152        0.634        0.719
##  1052    315       1    0.673 0.02156        0.632        0.717
##  1057    314       1    0.671 0.02160        0.630        0.715
##  1081    313       1    0.669 0.02164        0.628        0.713
##  1106    312       1    0.667 0.02167        0.625        0.710
##  1114    311       1    0.664 0.02171        0.623        0.708
##  1122    310       1    0.662 0.02175        0.621        0.706
##  1130    309       1    0.660 0.02178        0.619        0.704
##  1139    308       1    0.658 0.02182        0.617        0.702
##  1142    307       1    0.656 0.02185        0.614        0.700
##  1183    306       1    0.654 0.02188        0.612        0.698
##  1233    304       1    0.652 0.02192        0.610        0.696
##  1236    303       1    0.649 0.02195        0.608        0.694
##  1274    302       1    0.647 0.02198        0.606        0.692
##  1298    300       1    0.645 0.02201        0.603        0.690
##  1323    299       1    0.643 0.02205        0.601        0.688
##  1329    298       1    0.641 0.02208        0.599        0.686
##  1436    295       1    0.639 0.02211        0.597        0.683
##  1455    294       1    0.636 0.02214        0.595        0.681
##  1466    293       1    0.634 0.02217        0.592        0.679
##  1475    291       1    0.632 0.02220        0.590        0.677
##  1551    287       1    0.630 0.02223        0.588        0.675
##  1564    286       1    0.628 0.02226        0.586        0.673
##  1589    285       1    0.626 0.02229        0.583        0.671
##  1606    284       1    0.623 0.02232        0.581        0.669
##  1647    283       1    0.621 0.02235        0.579        0.667
##  1687    282       1    0.619 0.02238        0.577        0.664
##  1749    281       1    0.617 0.02241        0.574        0.662
##  1759    280       1    0.615 0.02244        0.572        0.660
##  1786    279       1    0.612 0.02247        0.570        0.658
##  1976    259       1    0.610 0.02250        0.567        0.656
##  1981    256       1    0.608 0.02254        0.565        0.653
##  2028    245       1    0.605 0.02259        0.562        0.651
##  2035    242       1    0.603 0.02263        0.560        0.649
##  2067    235       1    0.600 0.02268        0.557        0.646
##  2074    233       1    0.597 0.02273        0.555        0.644
##  2695     51       1    0.586 0.02512        0.539        0.637
##
##                 nodes.ds=<3, obstruct=obstruct
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
```

```
##    19    116       1    0.991 0.00858        0.975        1.000
##    68    113       1    0.983 0.01219        0.959        1.000
##    98    112       1    0.974 0.01491        0.945        1.000
##    99    111       2    0.956 0.01912        0.920        0.995
##   111    109       1    0.948 0.02086        0.907        0.989
##   121    108       1    0.939 0.02244        0.896        0.984
##   154    107       1    0.930 0.02388        0.884        0.978
##   161    106       1    0.921 0.02521        0.873        0.972
##   174    105       1    0.912 0.02646        0.862        0.966
##   185    104       2    0.895 0.02871        0.840        0.953
##   199    102       1    0.886 0.02974        0.830        0.946
##   218    101       1    0.877 0.03071        0.819        0.940
##   228    100       1    0.869 0.03163        0.809        0.933
##   260     99       1    0.860 0.03251        0.798        0.926
##   279     98       1    0.851 0.03334        0.788        0.919
##   280     97       1    0.842 0.03413        0.778        0.912
##   290     96       1    0.833 0.03488        0.768        0.905
##   335     94       1    0.825 0.03562        0.758        0.897
##   337     93       1    0.816 0.03632        0.748        0.890
##   352     92       1    0.807 0.03700        0.738        0.883
##   354     91       1    0.798 0.03764        0.728        0.875
##   360     90       1    0.789 0.03825        0.718        0.868
##   366     89       1    0.780 0.03883        0.708        0.860
##   382     88       1    0.771 0.03939        0.698        0.853
##   389     87       1    0.763 0.03992        0.688        0.845
##   411     86       1    0.754 0.04043        0.678        0.837
##   413     85       1    0.745 0.04092        0.669        0.829
##   415     84       1    0.736 0.04138        0.659        0.822
##   422     83       1    0.727 0.04182        0.650        0.814
##   449     82       1    0.718 0.04224        0.640        0.806
##   476     81       1    0.709 0.04264        0.630        0.798
##   489     80       1    0.700 0.04302        0.621        0.790
##   493     79       1    0.692 0.04338        0.612        0.782
##   504     78       1    0.683 0.04372        0.602        0.774
##   532     77       1    0.674 0.04404        0.593        0.766
##   554     76       1    0.665 0.04434        0.584        0.758
##   577     75       1    0.656 0.04463        0.574        0.750
##   604     74       1    0.647 0.04490        0.565        0.742
##   726     73       1    0.638 0.04515        0.556        0.733
##   772     72       1    0.630 0.04539        0.547        0.725
##   828     71       1    0.621 0.04561        0.537        0.717
##   871     70       1    0.612 0.04581        0.528        0.708
##   918     69       1    0.603 0.04599        0.519        0.700
##   960     68       1    0.594 0.04616        0.510        0.692
##  1026     67       1    0.585 0.04632        0.501        0.683
##  1211     66       1    0.576 0.04646        0.492        0.675
##  1471     65       1    0.567 0.04658        0.483        0.667
##  1743     64       1    0.559 0.04669        0.474        0.658
##  1895     58       1    0.549 0.04687        0.464        0.649
##  2012     53       1    0.539 0.04711        0.454        0.639
##  2018     52       1    0.528 0.04733        0.443        0.630
##  2031     51       1    0.518 0.04752        0.433        0.620
##  2036     50       1    0.508 0.04769        0.422        0.610
##  2231     30       1    0.491 0.04901        0.403        0.597
```

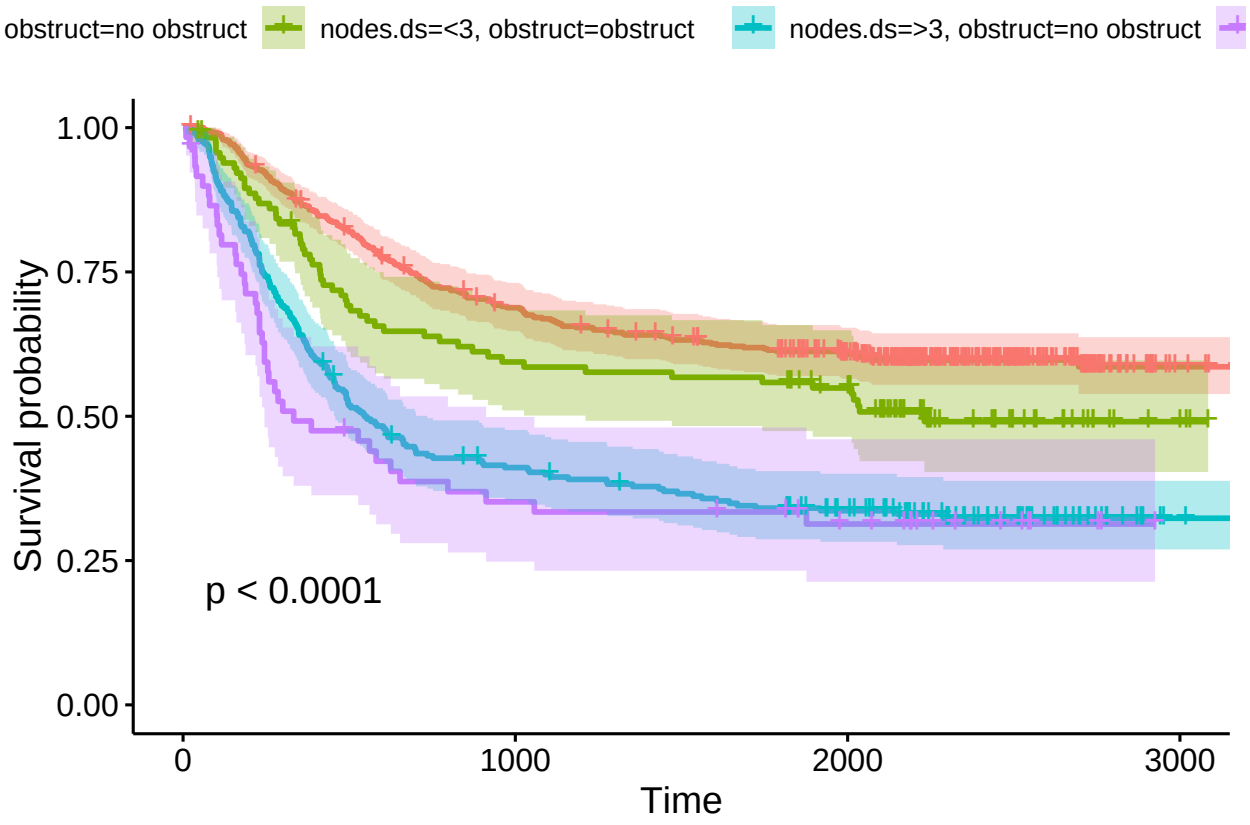
```
##
##                nodes.ds=>3, obstruct=no obstruct
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##     8    256       1    0.996 0.00390        0.988        1.000
##    28    255       1    0.992 0.00550        0.981        1.000
##    38    254       1    0.988 0.00673        0.975        1.000
##    43    253       1    0.984 0.00775        0.969        1.000
##    45    252       1    0.980 0.00865        0.964        0.998
##    49    251       1    0.977 0.00946        0.958        0.995
##    63    250       1    0.973 0.01019        0.953        0.993
##    72    249       1    0.969 0.01087        0.948        0.990
##    77    248       1    0.965 0.01151        0.943        0.988
##    78    247       1    0.961 0.01211        0.937        0.985
##    79    246       1    0.957 0.01267        0.933        0.982
##    80    245       2    0.949 0.01372        0.923        0.976
##    85    243       2    0.941 0.01468        0.913        0.971
##    86    241       1    0.938 0.01513        0.908        0.968
##    88    240       1    0.934 0.01556        0.904        0.965
##    91    239       2    0.926 0.01638        0.894        0.958
##    94    237       1    0.922 0.01677        0.890        0.955
##    98    236       2    0.914 0.01752        0.880        0.949
##   100    234       1    0.910 0.01787        0.876        0.946
##   101    233       1    0.906 0.01822        0.871        0.943
##   105    232       1    0.902 0.01855        0.867        0.939
##   108    231       1    0.898 0.01888        0.862        0.936
##   113    230       2    0.891 0.01951        0.853        0.930
##   121    228       1    0.887 0.01981        0.849        0.926
##   122    227       1    0.883 0.02010        0.844        0.923
##   127    226       1    0.879 0.02039        0.840        0.920
##   132    225       1    0.875 0.02067        0.835        0.916
##   136    224       1    0.871 0.02094        0.831        0.913
##   145    223       1    0.867 0.02121        0.827        0.910
##   146    222       2    0.859 0.02173        0.818        0.903
##   147    220       1    0.855 0.02198        0.813        0.900
##   161    219       1    0.852 0.02222        0.809        0.896
##   165    218       1    0.848 0.02246        0.805        0.893
##   166    217       1    0.844 0.02269        0.800        0.889
##   173    216       3    0.832 0.02336        0.787        0.879
##   176    213       1    0.828 0.02358        0.783        0.876
##   185    212       2    0.820 0.02400        0.775        0.869
##   198    210       1    0.816 0.02420        0.770        0.865
##   201    209       1    0.812 0.02439        0.766        0.862
##   203    208       1    0.809 0.02459        0.762        0.858
##   204    207       1    0.805 0.02478        0.758        0.855
##   208    206       2    0.797 0.02515        0.749        0.848
##   215    204       1    0.793 0.02532        0.745        0.844
##   216    203       1    0.789 0.02550        0.741        0.841
##   218    202       1    0.785 0.02567        0.736        0.837
##   221    201       1    0.781 0.02584        0.732        0.834
##   229    200       2    0.773 0.02616        0.724        0.826
##   230    198       3    0.762 0.02663        0.711        0.816
##   235    195       1    0.758 0.02678        0.707        0.812
##   237    194       2    0.750 0.02706        0.699        0.805
##   242    192       1    0.746 0.02720        0.695        0.801
```

```
##   246   191       1   0.742 0.02734       0.690       0.798
##   256   190       1   0.738 0.02747       0.686       0.794
##   257   189       1   0.734 0.02760       0.682       0.791
##   260   188       1   0.730 0.02773       0.678       0.787
##   261   187       1   0.727 0.02786       0.674       0.783
##   263   186       1   0.723 0.02798       0.670       0.780
##   273   185       1   0.719 0.02810       0.666       0.776
##   274   184       1   0.715 0.02822       0.662       0.772
##   279   183       2   0.707 0.02845       0.653       0.765
##   286   181       2   0.699 0.02866       0.645       0.758
##   294   179       1   0.695 0.02877       0.641       0.754
##   296   178       1   0.691 0.02887       0.637       0.750
##   304   177       1   0.688 0.02897       0.633       0.747
##   313   176       1   0.684 0.02907       0.629       0.743
##   315   175       1   0.680 0.02916       0.625       0.739
##   322   174       2   0.672 0.02935       0.617       0.732
##   328   172       1   0.668 0.02943       0.613       0.728
##   334   171       1   0.664 0.02952       0.609       0.725
##   337   170       1   0.660 0.02960       0.605       0.721
##   341   169       1   0.656 0.02968       0.601       0.717
##   344   168       1   0.652 0.02976       0.597       0.713
##   348   167       2   0.645 0.02992       0.588       0.706
##   349   165       1   0.641 0.02999       0.584       0.702
##   360   164       1   0.637 0.03006       0.580       0.698
##   362   163       1   0.633 0.03013       0.576       0.695
##   365   162       1   0.629 0.03019       0.572       0.691
##   370   161       1   0.625 0.03026       0.568       0.687
##   372   160       1   0.621 0.03032       0.564       0.683
##   374   159       1   0.617 0.03038       0.560       0.680
##   378   158       1   0.613 0.03044       0.556       0.676
##   384   157       1   0.609 0.03049       0.552       0.672
##   386   156       1   0.605 0.03055       0.548       0.668
##   393   155       1   0.602 0.03060       0.544       0.665
##   398   154       1   0.598 0.03065       0.541       0.661
##   408   153       1   0.594 0.03070       0.537       0.657
##   415   152       1   0.590 0.03074       0.533       0.653
##   429   150       1   0.586 0.03079       0.529       0.649
##   434   149       1   0.582 0.03083       0.525       0.646
##   435   148       1   0.578 0.03087       0.521       0.642
##   438   147       1   0.574 0.03091       0.517       0.638
##   439   146       1   0.570 0.03095       0.513       0.634
##   443   145       1   0.566 0.03098       0.509       0.630
##   454   143       2   0.558 0.03105       0.501       0.623
##   458   141       2   0.550 0.03111       0.493       0.615
##   466   139       1   0.546 0.03114       0.489       0.611
##   482   138       1   0.542 0.03117       0.485       0.607
##   490   137       1   0.539 0.03119       0.481       0.603
##   491   136       2   0.531 0.03123       0.473       0.595
##   495   134       1   0.527 0.03125       0.469       0.592
##   496   133       1   0.523 0.03126       0.465       0.588
##   498   132       1   0.519 0.03127       0.461       0.584
##   505   131       1   0.515 0.03128       0.457       0.580
##   523   130       1   0.511 0.03129       0.453       0.576
##   532   129       1   0.507 0.03130       0.449       0.572
```

```
##   542    128       1    0.503 0.03131        0.445        0.568
##   547    127       1    0.499 0.03131        0.441        0.564
##   554    126       1    0.495 0.03131        0.437        0.560
##   565    125       1    0.491 0.03131        0.433        0.556
##   578    124       1    0.487 0.03130        0.429        0.552
##   583    123       1    0.483 0.03130        0.425        0.549
##   602    122       1    0.479 0.03129        0.422        0.545
##   608    121       1    0.475 0.03128        0.418        0.541
##   613    120       1    0.471 0.03127        0.414        0.537
##   615    119       1    0.467 0.03126        0.410        0.533
##   617    118       1    0.463 0.03124        0.406        0.529
##   659    116       1    0.459 0.03123        0.402        0.525
##   663    115       2    0.451 0.03119        0.394        0.517
##   672    113       1    0.447 0.03117        0.390        0.513
##   697    112       1    0.443 0.03115        0.386        0.509
##   700    111       1    0.439 0.03112        0.382        0.505
##   701    110       1    0.435 0.03109        0.378        0.501
##   735    109       1    0.431 0.03106        0.375        0.497
##   752    108       1    0.427 0.03103        0.371        0.493
##   891    105       1    0.423 0.03100        0.367        0.489
##   900    104       1    0.419 0.03097        0.363        0.485
##   904    103       1    0.415 0.03094        0.359        0.480
##   968    102       1    0.411 0.03090        0.355        0.476
##  1037    101       1    0.407 0.03086        0.351        0.472
##  1042    100       1    0.403 0.03082        0.347        0.468
##  1089     99       1    0.399 0.03078        0.343        0.464
##  1108     97       1    0.395 0.03073        0.339        0.460
##  1159     96       1    0.391 0.03069        0.335        0.456
##  1275     95       1    0.387 0.03064        0.331        0.451
##  1277     94       1    0.382 0.03059        0.327        0.447
##  1353     92       1    0.378 0.03053        0.323        0.443
##  1432     91       1    0.374 0.03048        0.319        0.439
##  1446     90       1    0.370 0.03042        0.315        0.435
##  1488     89       1    0.366 0.03036        0.311        0.430
##  1535     88       1    0.362 0.03030        0.307        0.426
##  1561     87       1    0.357 0.03024        0.303        0.422
##  1606     86       1    0.353 0.03017        0.299        0.418
##  1644     85       1    0.349 0.03010        0.295        0.413
##  1668     84       1    0.345 0.03003        0.291        0.409
##  1723     83       1    0.341 0.02995        0.287        0.405
##  1918     75       1    0.336 0.02990        0.283        0.400
##  2148     58       1    0.331 0.02994        0.277        0.395
##  2288     46       1    0.323 0.03014        0.269        0.388
##
##                 nodes.ds=>3, obstruct=obstruct
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##     9     60       1    0.983  0.0165        0.951        1.000
##    20     59       1    0.967  0.0232        0.922        1.000
##    35     57       1    0.950  0.0283        0.896        1.000
##    36     56       1    0.933  0.0325        0.871        0.999
##    40     55       1    0.916  0.0360        0.848        0.989
##    59     54       1    0.899  0.0392        0.825        0.979
##    77     53       1    0.882  0.0419        0.803        0.968
##    80     52       1    0.865  0.0444        0.782        0.957
```

```
##   101     51       1    0.848  0.0467        0.761        0.945
##   103     50       1    0.831  0.0487        0.741        0.932
##   109     49       1    0.814  0.0506        0.721        0.920
##   116     48       1    0.797  0.0523        0.701        0.906
##   157     47       1    0.780  0.0539        0.681        0.893
##   160     46       1    0.763  0.0553        0.662        0.880
##   175     45       1    0.746  0.0566        0.643        0.866
##   185     44       1    0.729  0.0578        0.624        0.852
##   188     43       1    0.712  0.0589        0.606        0.838
##   218     42       1    0.695  0.0599        0.587        0.823
##   223     41       1    0.678  0.0608        0.569        0.809
##   230     40       2    0.644  0.0623        0.533        0.779
##   238     38       1    0.627  0.0629        0.516        0.764
##   245     37       2    0.594  0.0639        0.481        0.733
##   255     35       1    0.577  0.0643        0.463        0.718
##   258     34       1    0.560  0.0646        0.446        0.702
##   276     33       1    0.543  0.0649        0.429        0.686
##   286     32       1    0.526  0.0650        0.413        0.670
##   300     31       1    0.509  0.0651        0.396        0.654
##   333     30       1    0.492  0.0651        0.379        0.637
##   386     29       1    0.475  0.0650        0.363        0.621
##   527     27       1    0.457  0.0649        0.346        0.604
##   561     26       1    0.440  0.0648        0.329        0.587
##   581     25       1    0.422  0.0645        0.313        0.570
##   625     24       1    0.405  0.0642        0.296        0.552
##   653     23       1    0.387  0.0638        0.280        0.534
##   797     22       1    0.369  0.0632        0.264        0.517
##   912     21       1    0.352  0.0626        0.248        0.499
##  1057     20       1    0.334  0.0619        0.232        0.480
##  1876     16       1    0.313  0.0615        0.213        0.460
```

```
ggsurvplot(km_fit, data = colon_subset_recurrence, pval = TRUE,
           conf.int = TRUE)
```




```
km_fit <- survfit(surv~1 + nodes.ds + obstruct + adhere, data=colon_subset_recurrence)
summary(km_fit)
```

```
## Call: survfit(formula = surv ~ 1 + nodes.ds + obstruct + adhere, data = colon_subset_recurrence)
##
## 18 observations deleted due to missingness
##                 nodes.ds=<3, obstruct=no obstruct, adhere=no adhere
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##    62    410       2    0.995 0.00344        0.988        1.000
##    72    408       1    0.993 0.00421        0.984        1.000
##   102    407       1    0.990 0.00485        0.981        1.000
##   113    406       1    0.988 0.00542        0.977        0.998
##   116    405       1    0.985 0.00593        0.974        0.997
##   119    404       1    0.983 0.00640        0.970        0.996
##   131    403       1    0.980 0.00683        0.967        0.994
##   139    402       1    0.978 0.00724        0.964        0.992
##   141    401       1    0.976 0.00762        0.961        0.991
##   143    400       1    0.973 0.00798        0.958        0.989
##   157    399       1    0.971 0.00832        0.955        0.987
##   165    398       2    0.966 0.00897        0.948        0.984
##   167    396       1    0.963 0.00927        0.945        0.982
##   169    395       1    0.961 0.00956        0.942        0.980
##   174    394       1    0.959 0.00985        0.939        0.978
##   176    393       1    0.956 0.01012        0.936        0.976
##   179    392       1    0.954 0.01038        0.934        0.974
##   181    391       1    0.951 0.01064        0.931        0.972
##   183    390       1    0.949 0.01089        0.928        0.970
##   189    389       1    0.946 0.01113        0.925        0.968
```

```
##   191   388       2   0.941 0.01159        0.919        0.964
##   196   386       1   0.939 0.01182        0.916        0.962
##   205   385       1   0.937 0.01204        0.913        0.960
##   215   384       1   0.934 0.01225        0.910        0.958
##   224   382       1   0.932 0.01246        0.908        0.956
##   227   381       1   0.929 0.01266        0.905        0.954
##   238   380       1   0.927 0.01286        0.902        0.952
##   248   379       1   0.924 0.01306        0.899        0.950
##   250   378       1   0.922 0.01325        0.896        0.948
##   252   377       1   0.919 0.01344        0.894        0.946
##   256   376       1   0.917 0.01363        0.891        0.944
##   262   375       1   0.915 0.01381        0.888        0.942
##   263   374       1   0.912 0.01399        0.885        0.940
##   264   373       1   0.910 0.01416        0.882        0.938
##   276   372       1   0.907 0.01433        0.880        0.936
##   285   371       1   0.905 0.01450        0.877        0.934
##   290   370       1   0.902 0.01467        0.874        0.932
##   291   369       1   0.900 0.01483        0.871        0.929
##   294   368       1   0.897 0.01499        0.869        0.927
##   296   367       1   0.895 0.01515        0.866        0.925
##   303   366       1   0.893 0.01530        0.863        0.923
##   308   365       1   0.890 0.01545        0.860        0.921
##   315   364       1   0.888 0.01560        0.858        0.919
##   325   363       1   0.885 0.01575        0.855        0.917
##   329   362       1   0.883 0.01590        0.852        0.915
##   330   361       2   0.878 0.01618        0.847        0.910
##   336   359       2   0.873 0.01645        0.841        0.906
##   352   357       1   0.871 0.01659        0.839        0.904
##   356   355       1   0.868 0.01672        0.836        0.902
##   379   354       1   0.866 0.01685        0.833        0.899
##   380   353       1   0.863 0.01698        0.831        0.897
##   392   352       1   0.861 0.01711        0.828        0.895
##   401   351       1   0.858 0.01724        0.825        0.893
##   402   350       1   0.856 0.01736        0.822        0.891
##   406   349       1   0.853 0.01749        0.820        0.888
##   431   348       1   0.851 0.01761        0.817        0.886
##   433   347       1   0.848 0.01773        0.814        0.884
##   440   346       1   0.846 0.01784        0.812        0.882
##   448   345       1   0.844 0.01796        0.809        0.880
##   461   344       1   0.841 0.01807        0.806        0.877
##   466   343       1   0.839 0.01819        0.804        0.875
##   485   342       1   0.836 0.01830        0.801        0.873
##   499   340       1   0.834 0.01841        0.798        0.871
##   510   339       1   0.831 0.01852        0.796        0.868
##   511   338       1   0.829 0.01863        0.793        0.866
##   525   337       1   0.826 0.01873        0.790        0.864
##   534   336       1   0.824 0.01884        0.788        0.862
##   536   335       1   0.821 0.01894        0.785        0.859
##   540   334       1   0.819 0.01904        0.783        0.857
##   543   333       2   0.814 0.01924        0.777        0.853
##   555   331       1   0.812 0.01934        0.775        0.850
##   560   330       1   0.809 0.01944        0.772        0.848
##   573   329       2   0.804 0.01963        0.767        0.844
##   578   327       1   0.802 0.01972        0.764        0.841
```

```
##   591    326       1    0.799 0.01982       0.761       0.839
##   593    325       2    0.794 0.02000       0.756       0.835
##   594    323       1    0.792 0.02009       0.754       0.832
##   599    322       1    0.790 0.02017       0.751       0.830
##   616    321       1    0.787 0.02026       0.748       0.828
##   632    320       1    0.785 0.02034       0.746       0.825
##   636    319       1    0.782 0.02043       0.743       0.823
##   638    318       1    0.780 0.02051       0.740       0.821
##   654    317       1    0.777 0.02059       0.738       0.819
##   657    316       1    0.775 0.02068       0.735       0.816
##   680    314       1    0.772 0.02076       0.733       0.814
##   683    313       1    0.770 0.02084       0.730       0.812
##   686    312       1    0.767 0.02092       0.727       0.809
##   702    311       2    0.762 0.02107       0.722       0.805
##   711    309       1    0.760 0.02115       0.720       0.803
##   712    308       1    0.757 0.02122       0.717       0.800
##   730    307       1    0.755 0.02129       0.714       0.798
##   731    306       1    0.753 0.02137       0.712       0.796
##   739    305       1    0.750 0.02144       0.709       0.793
##   742    304       1    0.748 0.02151       0.707       0.791
##   748    303       1    0.745 0.02158       0.704       0.789
##   751    302       1    0.743 0.02165       0.701       0.786
##   774    301       1    0.740 0.02172       0.699       0.784
##   803    300       1    0.738 0.02178       0.696       0.782
##   805    299       1    0.735 0.02185       0.694       0.779
##   827    298       1    0.733 0.02192       0.691       0.777
##   835    297       1    0.730 0.02198       0.688       0.775
##   849    295       1    0.728 0.02205       0.686       0.772
##   855    294       1    0.725 0.02211       0.683       0.770
##   883    293       1    0.723 0.02217       0.681       0.768
##   922    291       1    0.720 0.02223       0.678       0.765
##   930    290       1    0.718 0.02230       0.676       0.763
##   931    289       1    0.715 0.02236       0.673       0.761
##   936    288       1    0.713 0.02242       0.670       0.758
##   959    286       1    0.710 0.02248       0.668       0.756
##   975    285       1    0.708 0.02254       0.665       0.754
##  1020    284       1    0.705 0.02259       0.663       0.751
##  1024    283       1    0.703 0.02265       0.660       0.749
##  1025    282       1    0.701 0.02271       0.657       0.746
##  1029    281       1    0.698 0.02276       0.655       0.744
##  1032    280       1    0.696 0.02282       0.652       0.742
##  1052    279       1    0.693 0.02287       0.650       0.739
##  1057    278       1    0.691 0.02293       0.647       0.737
##  1081    277       1    0.688 0.02298       0.644       0.735
##  1106    276       1    0.686 0.02303       0.642       0.732
##  1114    275       1    0.683 0.02308       0.639       0.730
##  1122    274       1    0.681 0.02313       0.637       0.727
##  1130    273       1    0.678 0.02318       0.634       0.725
##  1139    272       1    0.676 0.02323       0.632       0.723
##  1183    271       1    0.673 0.02328       0.629       0.720
##  1233    269       1    0.671 0.02332       0.626       0.718
##  1236    268       1    0.668 0.02337       0.624       0.715
##  1274    267       1    0.666 0.02342       0.621       0.713
##  1298    265       1    0.663 0.02346       0.619       0.711
```

```
##  1323    264       1    0.661 0.02351        0.616        0.708
##  1436    262       1    0.658 0.02355        0.613        0.706
##  1455    261       1    0.656 0.02360        0.611        0.703
##  1475    259       1    0.653 0.02364        0.608        0.701
##  1551    255       1    0.650 0.02369        0.606        0.699
##  1606    254       1    0.648 0.02373        0.603        0.696
##  1647    253       1    0.645 0.02377        0.600        0.694
##  1687    252       1    0.643 0.02382        0.598        0.691
##  1749    251       1    0.640 0.02386        0.595        0.689
##  1759    250       1    0.638 0.02390        0.592        0.686
##  1786    249       1    0.635 0.02394        0.590        0.684
##  1976    232       1    0.632 0.02400        0.587        0.681
##  1981    229       1    0.630 0.02405        0.584        0.679
##  2028    219       1    0.627 0.02411        0.581        0.676
##  2035    216       1    0.624 0.02417        0.578        0.673
##  2067    211       1    0.621 0.02424        0.575        0.670
##  2074    209       1    0.618 0.02430        0.572        0.667
##  2695     46       1    0.604 0.02724        0.553        0.660
##
##                nodes.ds=<3, obstruct=no obstruct, adhere=adhere
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##    86     68       1    0.985  0.0146        0.957        1.000
##   116     67       1    0.971  0.0205        0.931        1.000
##   118     66       1    0.956  0.0249        0.908        1.000
##   154     65       1    0.941  0.0285        0.887        0.999
##   157     64       1    0.926  0.0317        0.866        0.991
##   189     63       1    0.912  0.0344        0.847        0.982
##   243     62       1    0.897  0.0369        0.828        0.972
##   271     61       1    0.882  0.0391        0.809        0.962
##   337     60       1    0.868  0.0411        0.791        0.952
##   356     58       1    0.853  0.0430        0.772        0.941
##   369     57       1    0.838  0.0448        0.754        0.930
##   380     56       1    0.823  0.0464        0.737        0.919
##   405     55       1    0.808  0.0479        0.719        0.907
##   437     54       1    0.793  0.0493        0.702        0.896
##   465     53       1    0.778  0.0506        0.685        0.884
##   474     52       1    0.763  0.0518        0.668        0.872
##   480     51       1    0.748  0.0529        0.651        0.859
##   497     50       1    0.733  0.0539        0.635        0.847
##   513     49       1    0.718  0.0549        0.618        0.834
##   526     48       1    0.703  0.0557        0.602        0.821
##   548     47       1    0.688  0.0565        0.586        0.808
##   593     46       1    0.673  0.0572        0.570        0.795
##   622     44       1    0.658  0.0579        0.554        0.782
##   649     43       1    0.643  0.0586        0.537        0.768
##   668     42       1    0.627  0.0591        0.521        0.755
##   717     41       1    0.612  0.0596        0.506        0.741
##   851     40       1    0.597  0.0601        0.490        0.727
##   853     39       1    0.581  0.0605        0.474        0.713
##   934     38       1    0.566  0.0608        0.459        0.699
##  1013     37       1    0.551  0.0610        0.443        0.684
##  1142     36       1    0.535  0.0612        0.428        0.670
##  1329     35       1    0.520  0.0613        0.413        0.655
##  1466     33       1    0.504  0.0615        0.397        0.641
```

```
##  1564     32       1    0.489  0.0615        0.382        0.625
##  1589     31       1    0.473  0.0615        0.366        0.610
##
##                nodes.ds=<3, obstruct=obstruct   , adhere=no adhere
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##    19     98       1    0.990  0.0102        0.970        1.000
##    98     95       1    0.979  0.0144        0.951        1.000
##    99     94       2    0.959  0.0203        0.920        0.999
##   111     92       1    0.948  0.0226        0.905        0.993
##   121     91       1    0.938  0.0246        0.891        0.987
##   161     90       1    0.927  0.0265        0.877        0.981
##   174     89       1    0.917  0.0281        0.863        0.974
##   185     88       2    0.896  0.0311        0.837        0.959
##   199     86       1    0.886  0.0325        0.824        0.952
##   218     85       1    0.875  0.0337        0.812        0.944
##   228     84       1    0.865  0.0349        0.799        0.936
##   260     83       1    0.854  0.0360        0.787        0.928
##   279     82       1    0.844  0.0370        0.774        0.920
##   280     81       1    0.834  0.0380        0.762        0.911
##   290     80       1    0.823  0.0389        0.750        0.903
##   335     78       1    0.813  0.0398        0.738        0.894
##   337     77       1    0.802  0.0407        0.726        0.886
##   354     76       1    0.791  0.0415        0.714        0.877
##   366     75       1    0.781  0.0423        0.702        0.868
##   382     74       1    0.770  0.0430        0.691        0.859
##   389     73       1    0.760  0.0437        0.679        0.850
##   411     72       1    0.749  0.0443        0.667        0.841
##   413     71       1    0.739  0.0449        0.656        0.832
##   422     70       1    0.728  0.0455        0.644        0.823
##   449     69       1    0.718  0.0461        0.633        0.814
##   476     68       1    0.707  0.0466        0.621        0.804
##   489     67       1    0.696  0.0471        0.610        0.795
##   493     66       1    0.686  0.0475        0.599        0.786
##   504     65       1    0.675  0.0480        0.588        0.776
##   554     64       1    0.665  0.0484        0.576        0.767
##   604     63       1    0.654  0.0487        0.565        0.757
##   772     62       1    0.644  0.0491        0.554        0.747
##   828     61       1    0.633  0.0494        0.543        0.738
##   871     60       1    0.623  0.0497        0.532        0.728
##   960     59       1    0.612  0.0499        0.522        0.718
##  1026     58       1    0.601  0.0502        0.511        0.708
##  1211     57       1    0.591  0.0504        0.500        0.698
##  1743     56       1    0.580  0.0506        0.489        0.689
##  2012     47       1    0.568  0.0510        0.476        0.677
##  2018     46       1    0.556  0.0514        0.464        0.666
##  2031     45       1    0.543  0.0517        0.451        0.655
##  2036     44       1    0.531  0.0520        0.438        0.643
##  2231     27       1    0.511  0.0536        0.416        0.628
##
##                nodes.ds=<3, obstruct=obstruct   , adhere=adhere
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##    68     18       1    0.944  0.0540        0.844        1.000
##   154     17       1    0.889  0.0741        0.755        1.000
##   352     16       1    0.833  0.0878        0.678        1.000
```

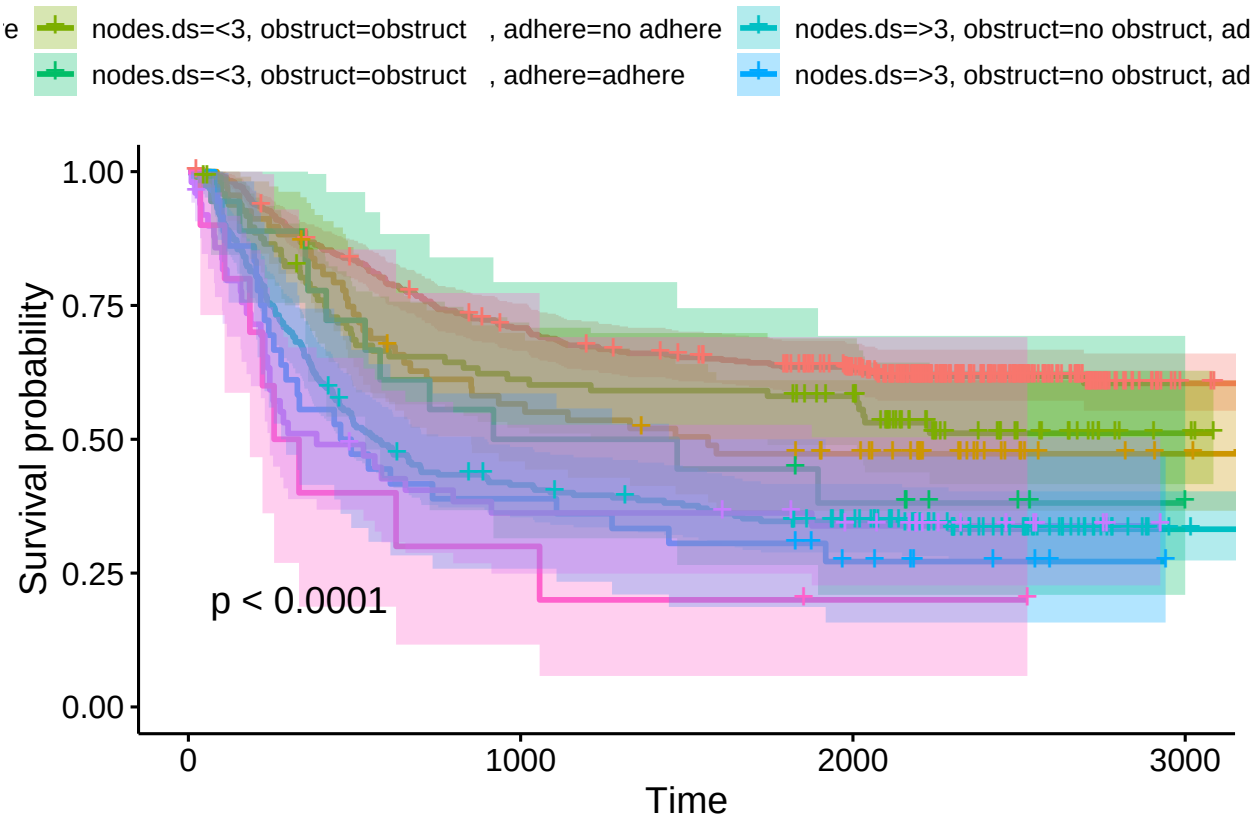
```
##   360     15       1    0.778  0.0980        0.608        0.996
##   415     14       1    0.722  0.1056        0.542        0.962
##   532     13       1    0.667  0.1111        0.481        0.924
##   577     12       1    0.611  0.1149        0.423        0.883
##   726     11       1    0.556  0.1171        0.368        0.840
##   918     10       1    0.500  0.1179        0.315        0.794
##  1471      9       1    0.444  0.1171        0.265        0.745
##  1895      7       1    0.381  0.1163        0.209        0.693
##
##                nodes.ds=>3, obstruct=no obstruct, adhere=no adhere
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##     8    220       1    0.995 0.00454        0.987        1.000
##    28    219       1    0.991 0.00640        0.978        1.000
##    38    218       1    0.986 0.00782        0.971        1.000
##    43    217       1    0.982 0.00901        0.964        1.000
##    45    216       1    0.977 0.01005        0.958        0.997
##    49    215       1    0.973 0.01098        0.951        0.994
##    63    214       1    0.968 0.01183        0.945        0.992
##    72    213       1    0.964 0.01262        0.939        0.989
##    77    212       1    0.959 0.01335        0.933        0.986
##    78    211       1    0.955 0.01404        0.927        0.982
##    79    210       1    0.950 0.01469        0.922        0.979
##    80    209       1    0.945 0.01531        0.916        0.976
##    85    208       2    0.936 0.01646        0.905        0.969
##    86    206       1    0.932 0.01699        0.899        0.966
##    91    205       2    0.923 0.01800        0.888        0.959
##    94    203       1    0.918 0.01848        0.883        0.955
##    98    202       2    0.909 0.01938        0.872        0.948
##   100    200       1    0.905 0.01981        0.867        0.944
##   108    199       1    0.900 0.02023        0.861        0.941
##   113    198       2    0.891 0.02102        0.851        0.933
##   122    196       1    0.886 0.02140        0.845        0.929
##   127    195       1    0.882 0.02176        0.840        0.926
##   132    194       1    0.877 0.02212        0.835        0.922
##   136    193       1    0.873 0.02247        0.830        0.918
##   145    192       1    0.868 0.02281        0.825        0.914
##   146    191       2    0.859 0.02346        0.814        0.906
##   147    189       1    0.855 0.02377        0.809        0.902
##   161    188       1    0.850 0.02407        0.804        0.899
##   165    187       1    0.845 0.02437        0.799        0.895
##   166    186       1    0.841 0.02466        0.794        0.891
##   173    185       3    0.827 0.02549        0.779        0.879
##   176    182       1    0.823 0.02575        0.774        0.875
##   185    181       2    0.814 0.02625        0.764        0.867
##   201    179       1    0.809 0.02650        0.759        0.863
##   203    178       1    0.805 0.02674        0.754        0.859
##   208    177       1    0.800 0.02697        0.749        0.855
##   215    176       1    0.795 0.02720        0.744        0.851
##   216    175       1    0.791 0.02742        0.739        0.847
##   221    174       1    0.786 0.02763        0.734        0.842
##   229    173       1    0.782 0.02785        0.729        0.838
##   230    172       3    0.768 0.02845        0.714        0.826
##   235    169       1    0.764 0.02864        0.710        0.822
##   237    168       2    0.755 0.02901        0.700        0.814
```

```
##   246   166       1    0.750 0.02919        0.695        0.809
##   256   165       1    0.745 0.02937        0.690        0.805
##   260   164       1    0.741 0.02954        0.685        0.801
##   261   163       1    0.736 0.02971        0.680        0.797
##   263   162       1    0.732 0.02987        0.676        0.793
##   273   161       1    0.727 0.03003        0.671        0.789
##   274   160       1    0.723 0.03018        0.666        0.784
##   279   159       1    0.718 0.03033        0.661        0.780
##   286   158       2    0.709 0.03062        0.652        0.772
##   296   156       1    0.705 0.03076        0.647        0.767
##   304   155       1    0.700 0.03090        0.642        0.763
##   313   154       1    0.695 0.03103        0.637        0.759
##   315   153       1    0.691 0.03116        0.632        0.755
##   322   152       2    0.682 0.03140        0.623        0.746
##   337   150       1    0.677 0.03152        0.618        0.742
##   341   149       1    0.673 0.03163        0.613        0.738
##   344   148       1    0.668 0.03175        0.609        0.733
##   348   147       2    0.659 0.03196        0.599        0.725
##   349   145       1    0.655 0.03206        0.595        0.720
##   360   144       1    0.650 0.03216        0.590        0.716
##   362   143       1    0.645 0.03225        0.585        0.712
##   365   142       1    0.641 0.03234        0.581        0.708
##   370   141       1    0.636 0.03243        0.576        0.703
##   372   140       1    0.632 0.03252        0.571        0.699
##   374   139       1    0.627 0.03260        0.567        0.695
##   378   138       1    0.623 0.03268        0.562        0.690
##   384   137       1    0.618 0.03275        0.557        0.686
##   386   136       1    0.614 0.03283        0.553        0.681
##   393   135       1    0.609 0.03290        0.548        0.677
##   398   134       1    0.605 0.03296        0.543        0.673
##   408   133       1    0.600 0.03303        0.539        0.668
##   415   132       1    0.595 0.03309        0.534        0.664
##   429   130       1    0.591 0.03315        0.529        0.660
##   434   129       1    0.586 0.03321        0.525        0.655
##   435   128       1    0.582 0.03326        0.520        0.651
##   438   127       1    0.577 0.03332        0.515        0.646
##   443   126       1    0.573 0.03336        0.511        0.642
##   454   124       2    0.563 0.03346        0.501        0.633
##   458   122       1    0.559 0.03350        0.497        0.628
##   466   121       1    0.554 0.03354        0.492        0.624
##   482   120       1    0.549 0.03358        0.487        0.619
##   491   119       2    0.540 0.03364        0.478        0.610
##   495   117       1    0.536 0.03367        0.474        0.606
##   496   116       1    0.531 0.03370        0.469        0.601
##   498   115       1    0.526 0.03372        0.464        0.597
##   505   114       1    0.522 0.03374        0.460        0.592
##   523   113       1    0.517 0.03375        0.455        0.588
##   532   112       1    0.513 0.03377        0.450        0.583
##   547   111       1    0.508 0.03378        0.446        0.579
##   554   110       1    0.503 0.03378        0.441        0.574
##   565   109       1    0.499 0.03379        0.437        0.569
##   578   108       1    0.494 0.03379        0.432        0.565
##   583   107       1    0.489 0.03379        0.428        0.560
##   602   106       1    0.485 0.03378        0.423        0.556
```

```
##   613    105       1    0.480 0.03377        0.418        0.551
##   615    104       1    0.476 0.03376        0.414        0.547
##   617    103       1    0.471 0.03375        0.409        0.542
##   659    101       1    0.466 0.03374        0.405        0.537
##   663    100       2    0.457 0.03370        0.395        0.528
##   672     98       1    0.452 0.03368        0.391        0.523
##   697     97       1    0.448 0.03365        0.386        0.519
##   700     96       1    0.443 0.03362        0.382        0.514
##   701     95       1    0.438 0.03359        0.377        0.509
##   752     94       1    0.434 0.03356        0.373        0.505
##   891     91       1    0.429 0.03352        0.368        0.500
##   900     90       1    0.424 0.03349        0.363        0.495
##   904     89       1    0.419 0.03345        0.359        0.490
##   968     88       1    0.415 0.03341        0.354        0.486
##  1037     87       1    0.410 0.03336        0.349        0.481
##  1042     86       1    0.405 0.03331        0.345        0.476
##  1089     85       1    0.400 0.03326        0.340        0.471
##  1159     83       1    0.395 0.03321        0.335        0.466
##  1277     82       1    0.391 0.03315        0.331        0.461
##  1353     80       1    0.386 0.03309        0.326        0.456
##  1432     79       1    0.381 0.03303        0.321        0.451
##  1488     78       1    0.376 0.03297        0.317        0.447
##  1535     77       1    0.371 0.03290        0.312        0.442
##  1561     76       1    0.366 0.03283        0.307        0.437
##  1606     75       1    0.361 0.03275        0.303        0.432
##  1644     74       1    0.356 0.03267        0.298        0.427
##  1668     73       1    0.352 0.03258        0.293        0.422
##  1723     72       1    0.347 0.03250        0.289        0.417
##  2148     52       1    0.340 0.03255        0.282        0.410
##  2288     42       1    0.332 0.03276        0.274        0.403
##
##                nodes.ds=>3, obstruct=no obstruct, adhere=adhere
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##    80     36       1    0.972  0.0274        0.920        1.000
##    88     35       1    0.944  0.0382        0.873        1.000
##   101     34       1    0.917  0.0461        0.831        1.000
##   105     33       1    0.889  0.0524        0.792        0.998
##   121     32       1    0.861  0.0576        0.755        0.982
##   198     31       1    0.833  0.0621        0.720        0.964
##   204     30       1    0.806  0.0660        0.686        0.946
##   208     29       1    0.778  0.0693        0.653        0.926
##   218     28       1    0.750  0.0722        0.621        0.906
##   229     27       1    0.722  0.0747        0.590        0.884
##   242     26       1    0.694  0.0768        0.559        0.862
##   257     25       1    0.667  0.0786        0.529        0.840
##   279     24       1    0.639  0.0801        0.500        0.817
##   294     23       1    0.611  0.0812        0.471        0.793
##   328     22       1    0.583  0.0822        0.443        0.769
##   334     21       1    0.556  0.0828        0.415        0.744
##   439     20       1    0.528  0.0832        0.387        0.719
##   458     19       1    0.500  0.0833        0.361        0.693
##   490     18       1    0.472  0.0832        0.334        0.667
##   542     17       1    0.444  0.0828        0.308        0.640
##   608     16       1    0.417  0.0822        0.283        0.613
```

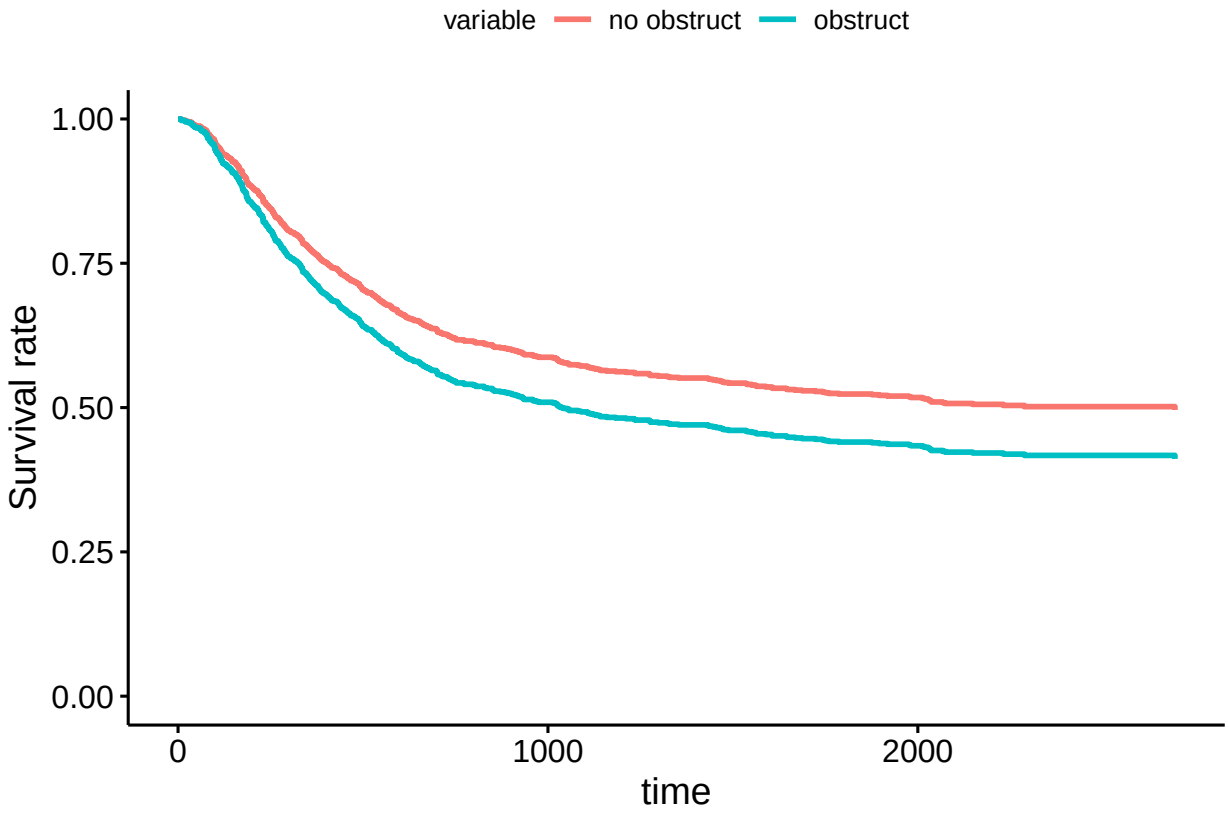
```
##   735     15       1    0.389  0.0812        0.258        0.586
##  1108     14       1    0.361  0.0801        0.234        0.558
##  1275     13       1    0.333  0.0786        0.210        0.529
##  1446     12       1    0.306  0.0768        0.187        0.500
##  1918      9       1    0.272  0.0754        0.158        0.468
##
##                nodes.ds=>3, obstruct=obstruct   , adhere=no adhere
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##     9     50       1    0.980  0.0198        0.942        1.000
##    20     49       1    0.960  0.0277        0.907        1.000
##    35     47       1    0.940  0.0338        0.876        1.000
##    40     46       1    0.919  0.0388        0.846        0.998
##    59     45       1    0.899  0.0430        0.818        0.987
##    77     44       1    0.878  0.0466        0.792        0.975
##    80     43       1    0.858  0.0498        0.766        0.961
##   101     42       1    0.837  0.0526        0.740        0.947
##   103     41       1    0.817  0.0552        0.716        0.933
##   116     40       1    0.797  0.0574        0.692        0.917
##   157     39       1    0.776  0.0595        0.668        0.902
##   160     38       1    0.756  0.0613        0.645        0.886
##   175     37       1    0.735  0.0630        0.622        0.870
##   188     36       1    0.715  0.0645        0.599        0.853
##   218     35       1    0.694  0.0658        0.577        0.836
##   230     34       2    0.654  0.0679        0.533        0.801
##   238     32       1    0.633  0.0688        0.512        0.784
##   245     31       2    0.592  0.0702        0.470        0.747
##   255     29       1    0.572  0.0707        0.449        0.729
##   276     28       1    0.551  0.0710        0.428        0.710
##   286     27       1    0.531  0.0713        0.408        0.691
##   300     26       1    0.511  0.0714        0.388        0.672
##   386     25       1    0.490  0.0714        0.368        0.652
##   527     23       1    0.469  0.0714        0.348        0.632
##   561     22       1    0.448  0.0713        0.328        0.612
##   581     21       1    0.426  0.0710        0.308        0.591
##   653     20       1    0.405  0.0706        0.288        0.570
##   797     19       1    0.384  0.0700        0.268        0.549
##   912     18       1    0.362  0.0693        0.249        0.527
##  1876     15       1    0.338  0.0688        0.227        0.504
##
##                nodes.ds=>3, obstruct=obstruct   , adhere=adhere
##  time n.risk n.event survival std.err lower 95% CI upper 95% CI
##    36     10       1      0.9  0.0949       0.7320        1.000
##   109      9       1      0.8  0.1265       0.5868        1.000
##   185      8       1      0.7  0.1449       0.4665        1.000
##   223      7       1      0.6  0.1549       0.3617        0.995
##   258      6       1      0.5  0.1581       0.2690        0.929
##   333      5       1      0.4  0.1549       0.1872        0.855
##   625      4       1      0.3  0.1449       0.1164        0.773
##  1057      3       1      0.2  0.1265       0.0579        0.691
```

```
ggsurvplot(km_fit, data = colon_subset_recurrence, pval = TRUE,
           conf.int = TRUE)
```



Cox Proportional Hazard

```
cox <- coxph(Surv(time,status) ~ 1 + obstruct, data=colon_subset_recurrence)
ggadjustedcurves(cox,data=colon_subset_recurrence,variable="obstruct",conf.int = TRUE)
```




```
summary(cox)
```

```
## Call:
## coxph(formula = Surv(time, status) ~ 1 + obstruct, data = colon_subset_recurrence)
##
##   n= 929, number of events= 468
##
##                     coef exp(coef) se(coef)     z Pr(>|z|)
## obstructobstruct 0.2370    1.2675   0.1132 2.094   0.0363 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##                  exp(coef) exp(-coef) lower .95 upper .95
## obstructobstruct     1.267      0.789     1.015     1.582
##
## Concordance= 0.523  (se = 0.01 )
## Likelihood ratio test= 4.18  on 1 df,   p=0.04
## Wald test            = 4.38  on 1 df,   p=0.04
## Score (logrank) test = 4.4  on 1 df,   p=0.04
```

```
coef(cox)
```

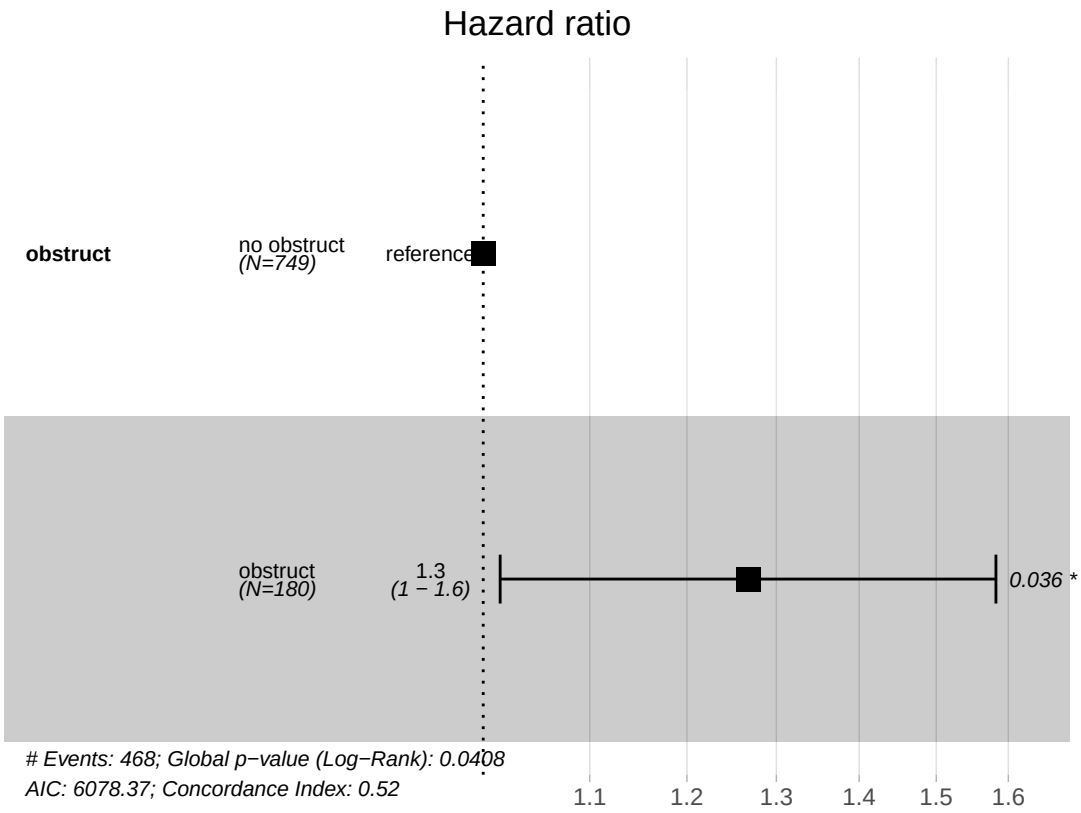
```
## obstructobstruct
##        0.2370211
```

```
test.ph <- cox.zph(cox)
test.ph
```

```
##                     rho chisq      p
## obstructobstruct -0.101  4.76 0.0291
```

```
ggforest(cox, data = colon_subset_recurrence)
```

```
## Warning: Removed 1 rows containing missing values (geom_errorbar).
```




```
cox <- coxph(Surv(time,status) ~ 1 + obstruct + adhere, data=colon_subset_recurrence)
```

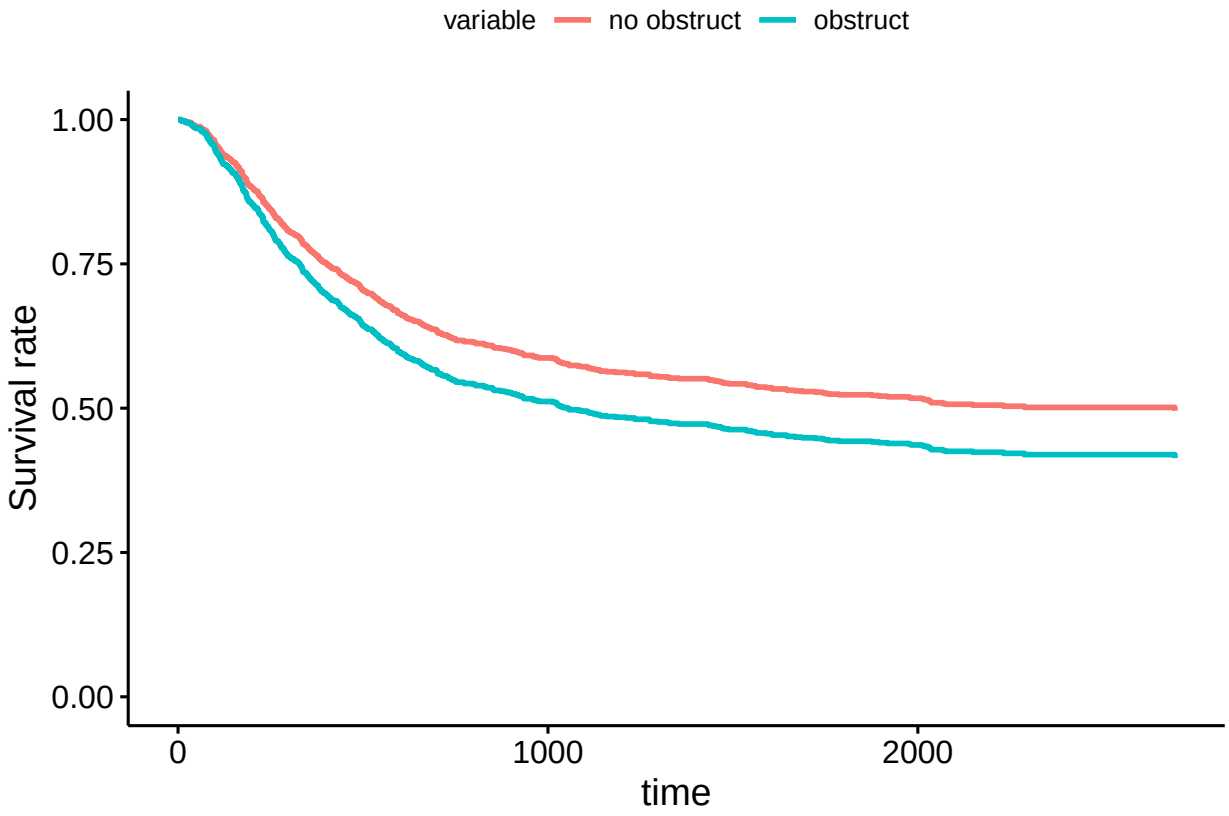
```
summary(cox)
```

```
## Call:
## coxph(formula = Surv(time, status) ~ 1 + obstruct + adhere, data = colon_subset_recurrence)
##
##   n= 929, number of events= 468
##
##                     coef exp(coef) se(coef)     z Pr(>|z|)
## obstructobstruct 0.2306    1.2593   0.1132 2.036   0.0417 *
## adhereadhere     0.3080    1.3606   0.1217 2.530   0.0114 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##                  exp(coef) exp(-coef) lower .95 upper .95
## obstructobstruct     1.259     0.7941     1.009     1.572
## adhereadhere         1.361     0.7349     1.072     1.727
##
## Concordance= 0.536  (se = 0.011 )
## Likelihood ratio test= 10.17  on 2 df,   p=0.006
## Wald test            = 10.81  on 2 df,   p=0.004
## Score (logrank) test = 10.88  on 2 df,   p=0.004
```

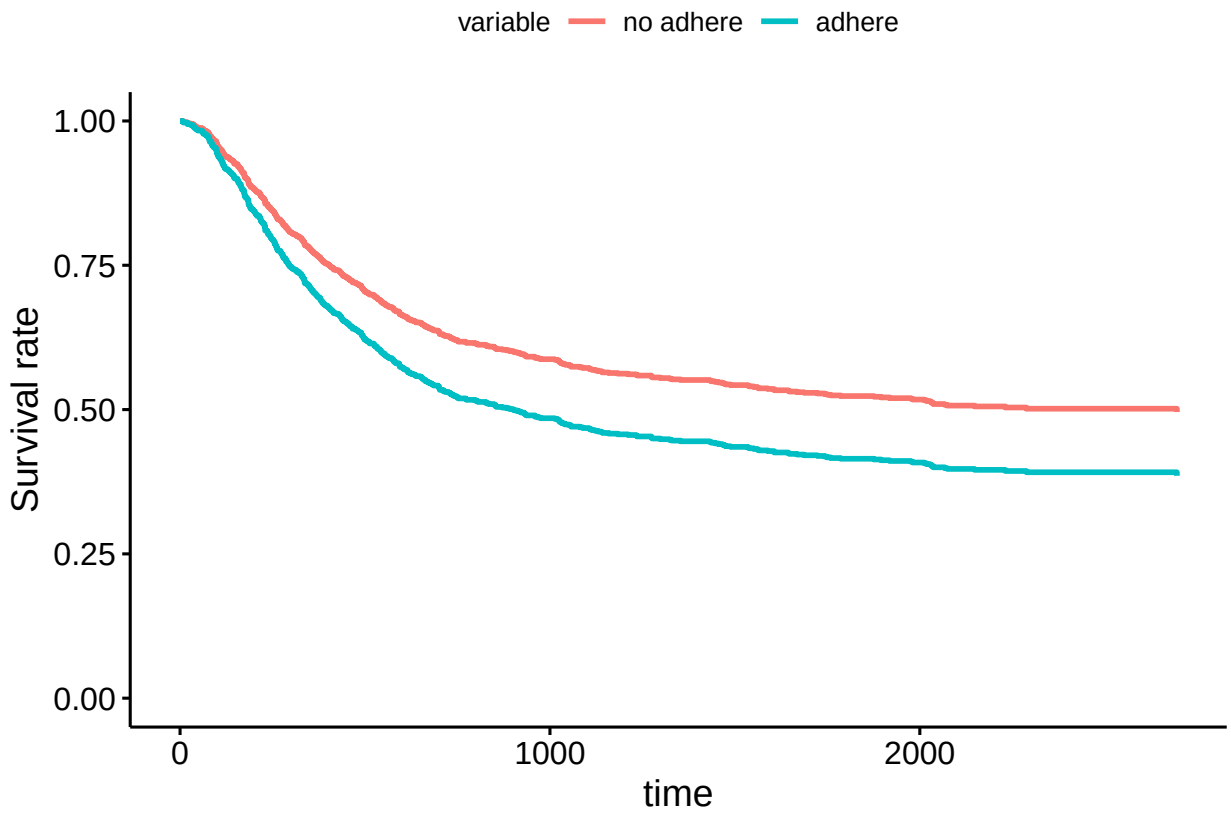
```
coef(cox)
```

```
## obstructobstruct     adhereadhere
##        0.2305705        0.3079530
```

```
ggadjustedcurves(cox,data=colon_subset_recurrence,variable = "obstruct",conf.int = TRUE)
```

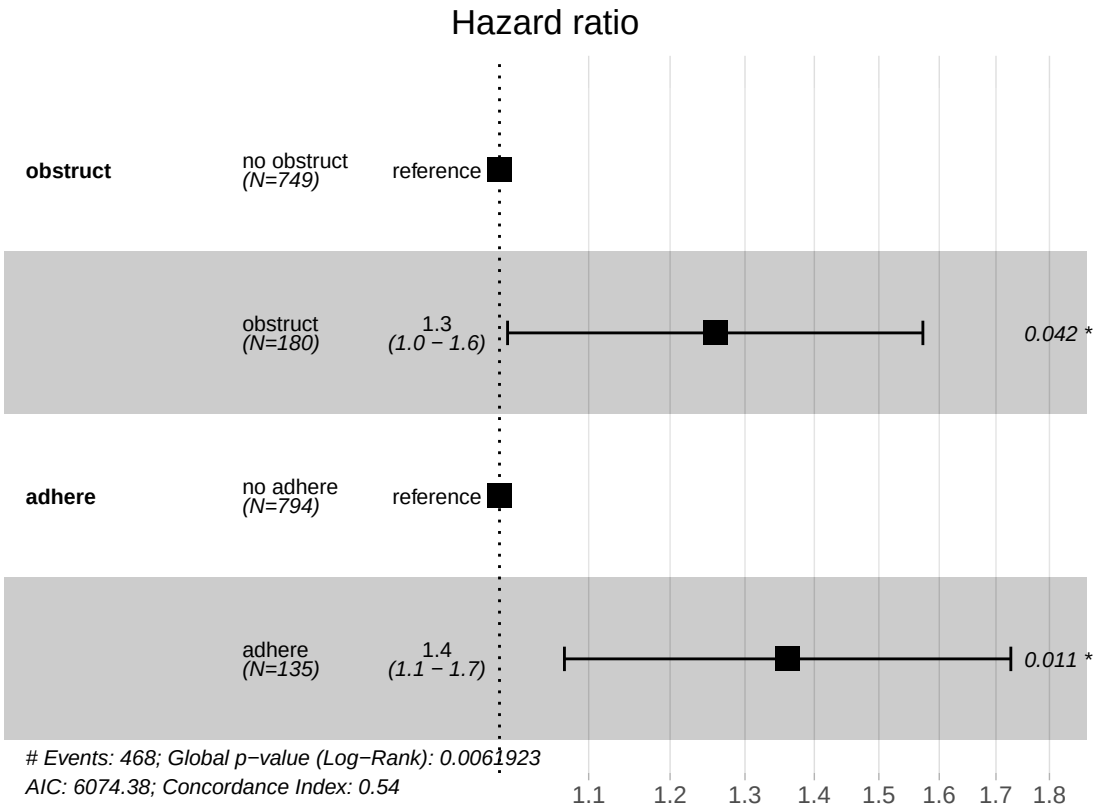



```
ggadjustedcurves(cox,data=colon_subset_recurrence,variable = "adhere",conf.int = TRUE)
```




```
ggforest(cox, data = colon_subset_recurrence)
```

```
## Warning: Removed 2 rows containing missing values (geom_errorbar).
```



```
test.ph <- cox.zph(cox)
test.ph
```

```
##                       rho chisq      p
## obstructobstruct -0.1020 4.853 0.0276
## adhereadhere      0.0449 0.943 0.3316
## GLOBAL                NA 5.693 0.0581
```

```
cox <- coxph(Surv(time,status) ~ 1 + obstruct + adhere + nodes.ds, data=colon_subset_recurrence)
```

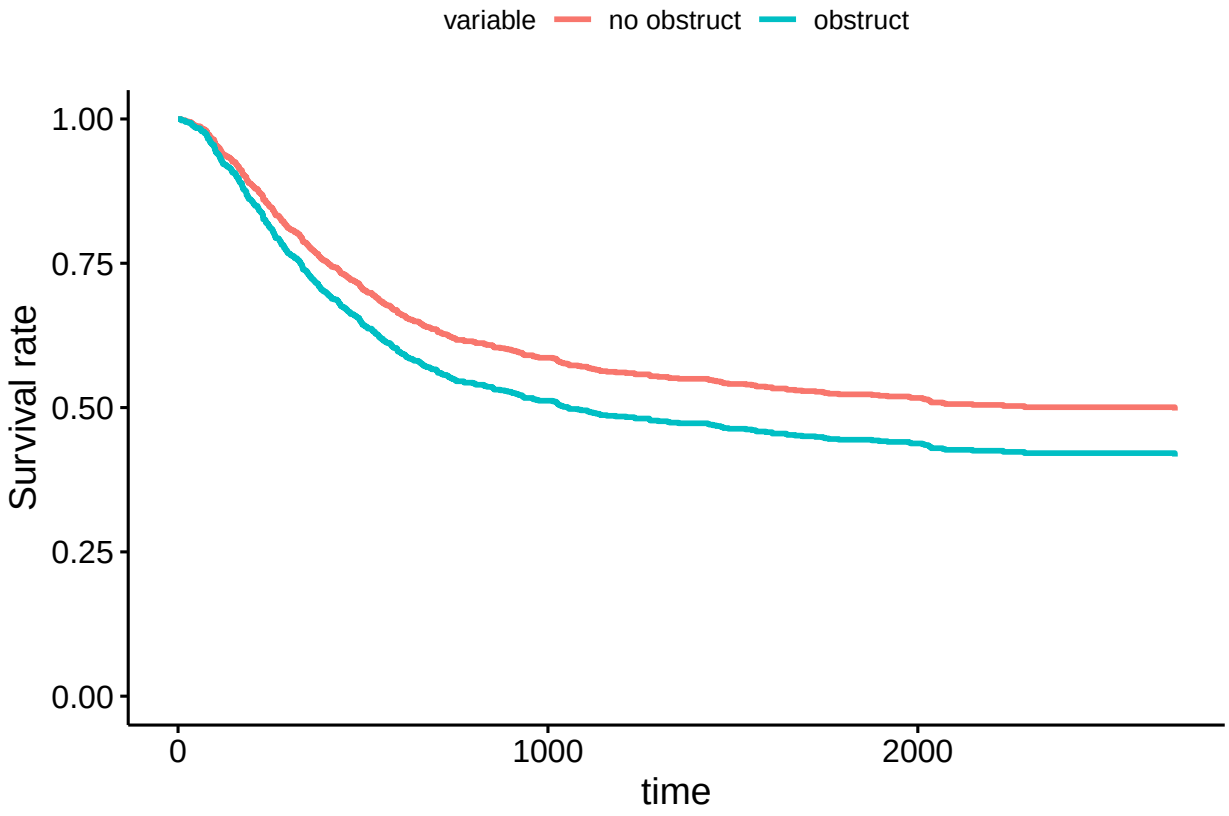
```
summary(cox)
```

```
## Call:
## coxph(formula = Surv(time, status) ~ 1 + obstruct + adhere +
##     nodes.ds, data = colon_subset_recurrence)
##
##   n= 911, number of events= 456
##    (18 observations deleted due to missingness)
##
##                      coef exp(coef) se(coef)     z Pr(>|z|)
## obstructobstruct 0.23954   1.27066  0.11495 2.084   0.0372 *
## adhereadhere     0.30972   1.36304  0.12324 2.513   0.0120 *
## nodes.ds>3       0.82056   2.27178  0.09434 8.698   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##                  exp(coef) exp(-coef) lower .95 upper .95
## obstructobstruct     1.271     0.7870     1.014     1.592
## adhereadhere         1.363     0.7337     1.071     1.735
## nodes.ds>3           2.272     0.4402     1.888     2.733
##
## Concordance= 0.625  (se = 0.013 )
## Likelihood ratio test= 81.98  on 3 df,   p=<2e-16
## Wald test            = 86.02  on 3 df,   p=<2e-16
## Score (logrank) test = 90.28  on 3 df,   p=<2e-16
```

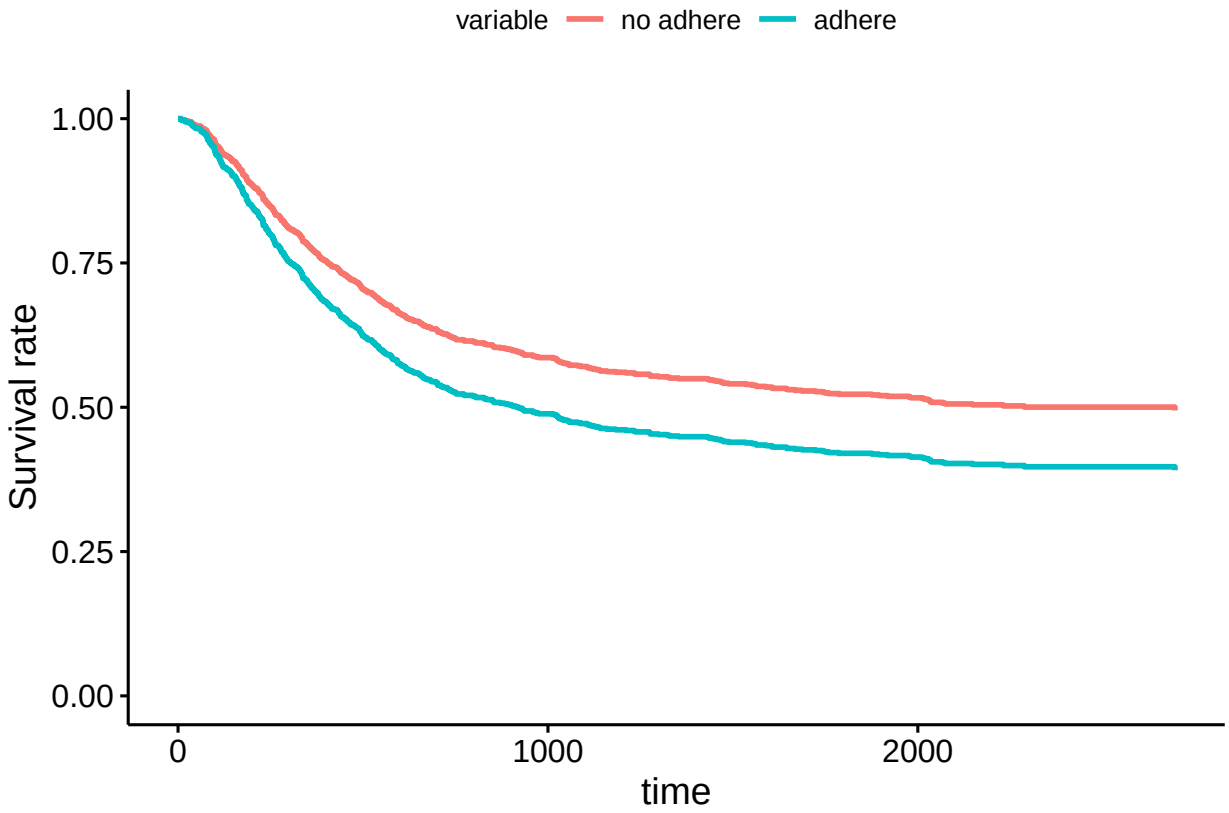
```
coef(cox)
```

```
## obstructobstruct     adhereadhere       nodes.ds>3
##        0.2395393        0.3097155        0.8205624
```

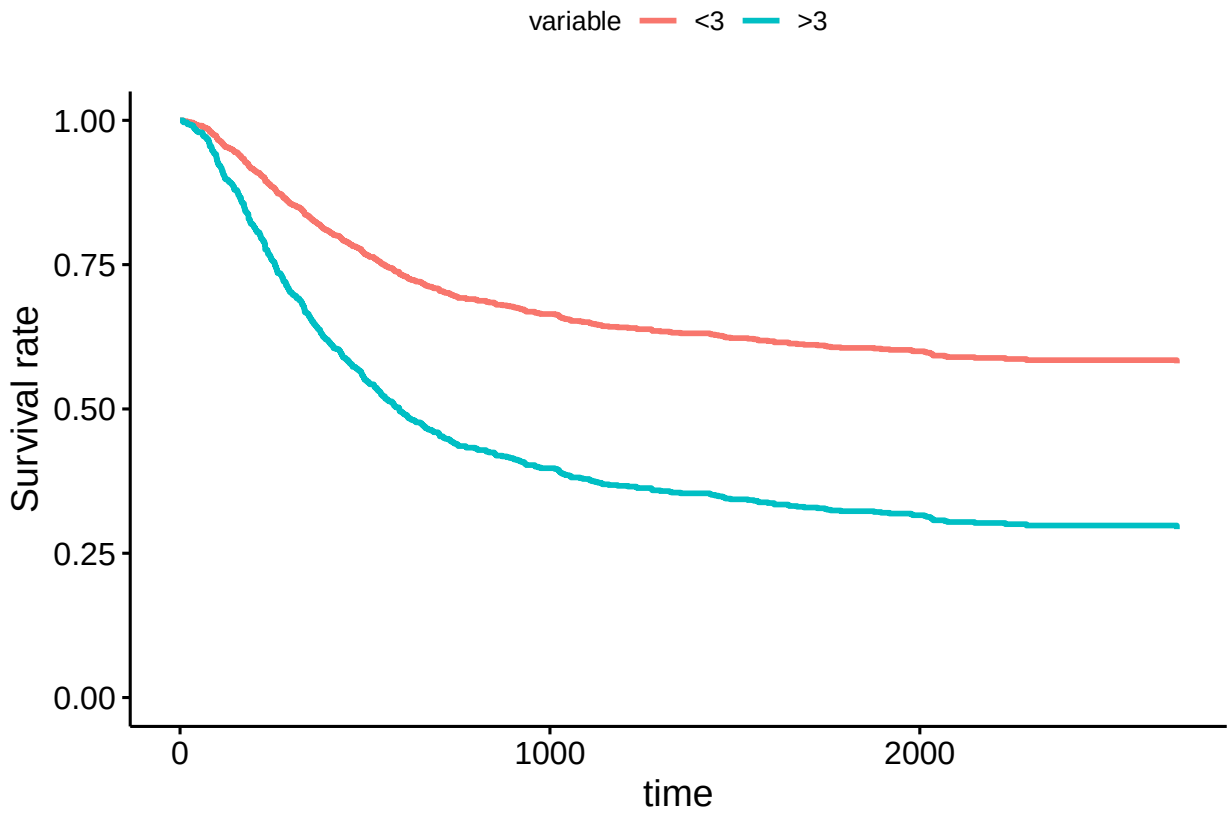
```
ggadjustedcurves(cox,data=colon_subset_recurrence,variable = "obstruct",conf.int = TRUE)
```




```
ggadjustedcurves(cox,data=colon_subset_recurrence,variable = "adhere",conf.int = TRUE)
```

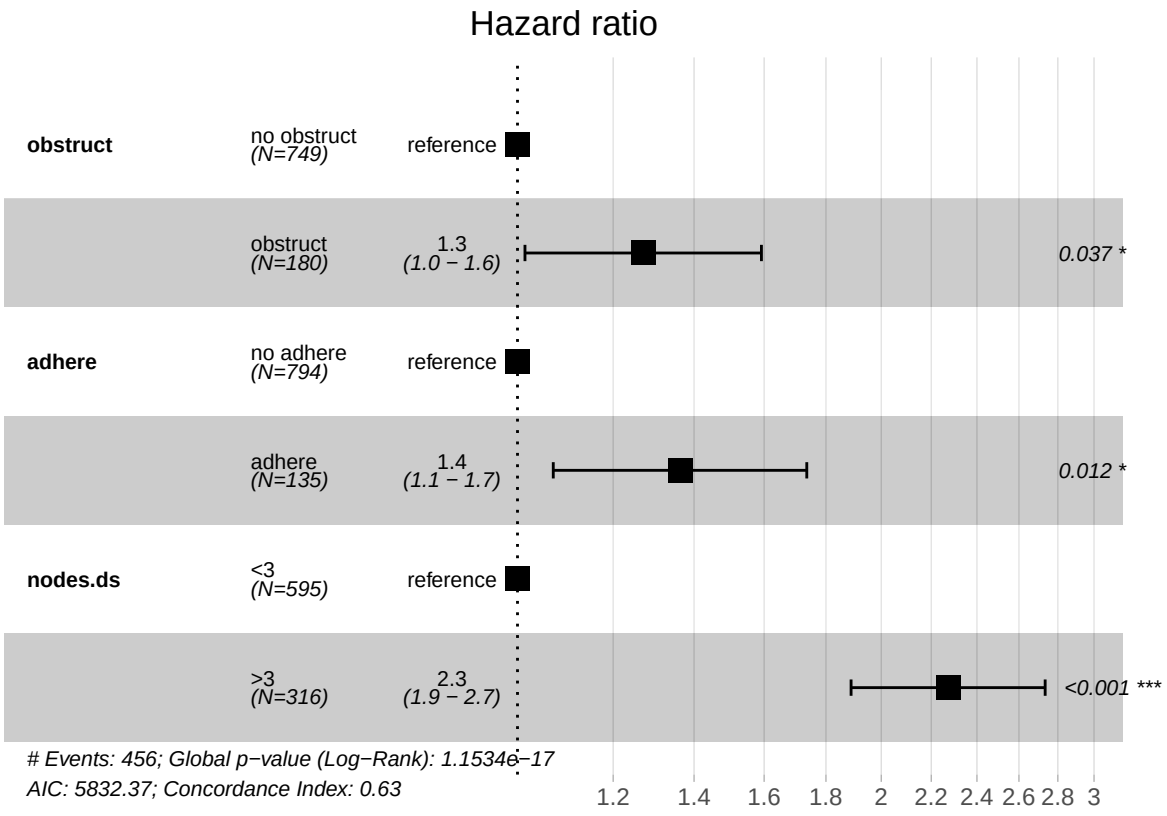


```
ggadjustedcurves(cox,data=colon_subset_recurrence,variable = "nodes.ds",conf.int = TRUE)
```




```
ggforest(cox, data = colon_subset_recurrence)
```

```
## Warning: Removed 3 rows containing missing values (geom_errorbar).
```




```
test.ph <- cox.zph(cox)
test.ph
```

```
##                       rho  chisq        p
## obstructobstruct -0.1032  4.831 2.80e-02
## adhereadhere      0.0467  0.994 3.19e-01
## nodes.ds>3       -0.1917 16.141 5.88e-05
## GLOBAL                NA 21.509 8.25e-05
```

```
cox <- coxph(Surv(time,status) ~ 1 + obstruct + adhere + nodes.ds + extent, data=colon_subset_recurrenc
```

```
summary(cox)
```

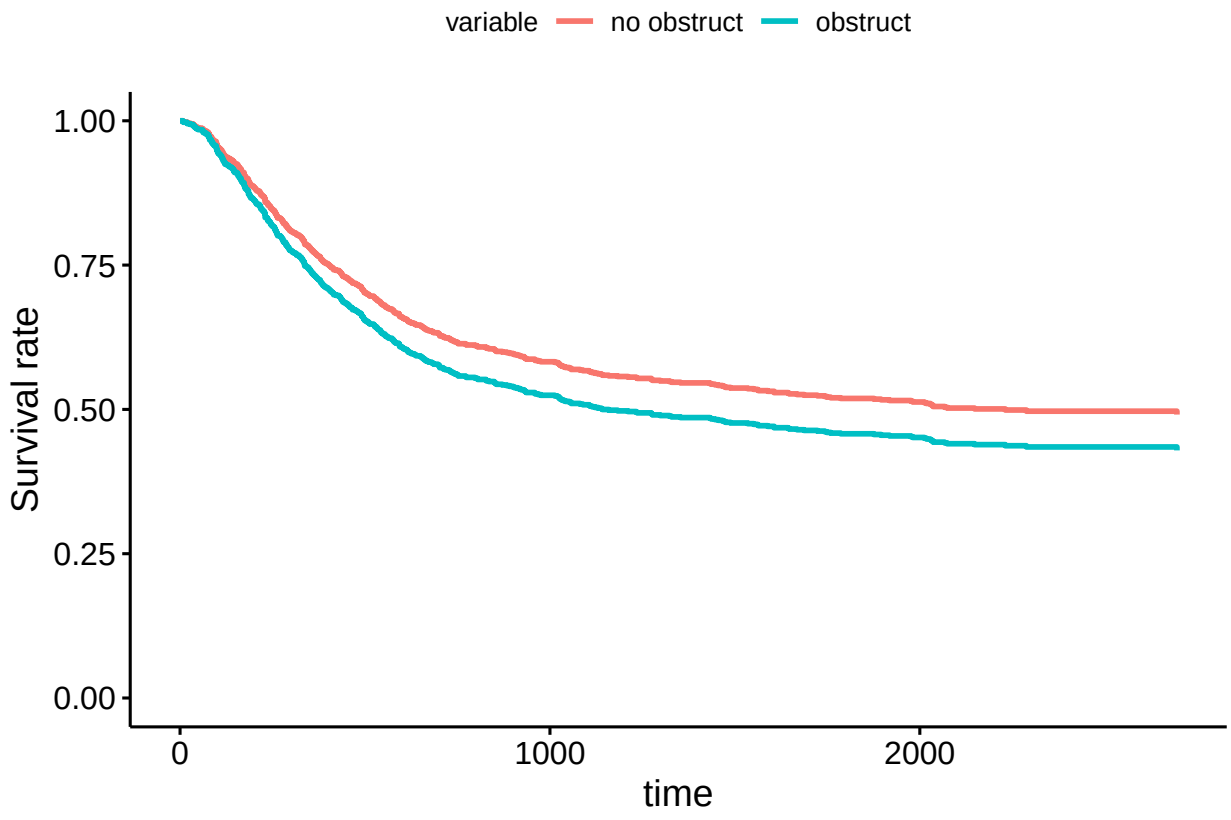
```
## Call:
## coxph(formula = Surv(time, status) ~ 1 + obstruct + adhere +
##     nodes.ds + extent, data = colon_subset_recurrence)
##
##   n= 911, number of events= 456
##    (18 observations deleted due to missingness)
##
##                     coef exp(coef) se(coef)     z Pr(>|z|)
## obstructobstruct 0.1908    1.2102   0.1154 1.653  0.09830 .
## adhereadhere     0.2427    1.2747   0.1254 1.936  0.05285 .
## nodes.ds>3       0.7883    2.1995   0.0946 8.332  < 2e-16 ***
## extentmuscle     0.3875    1.4732   0.5294 0.732  0.46422
## extentserosa     0.9573    2.6045   0.5043 1.898  0.05770 .
## extentcontiguous 1.5064    4.5106   0.5388 2.796  0.00518 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
##                   exp(coef) exp(-coef) lower .95 upper .95
## obstructobstruct      1.210     0.8263    0.9652     1.517
## adhereadhere          1.275     0.7845    0.9970     1.630
## nodes.ds>3            2.200     0.4546    1.8273     2.648
## extentmuscle          1.473     0.6788    0.5220     4.158
## extentserosa          2.605     0.3839    0.9692     6.999
## extentcontiguous      4.511     0.2217    1.5689    12.968
##
## Concordance= 0.641  (se = 0.013 )
## Likelihood ratio test= 106.1  on 6 df,   p=<2e-16
## Wald test            = 105.5  on 6 df,   p=<2e-16
## Score (logrank) test = 112.1  on 6 df,   p=<2e-16
```

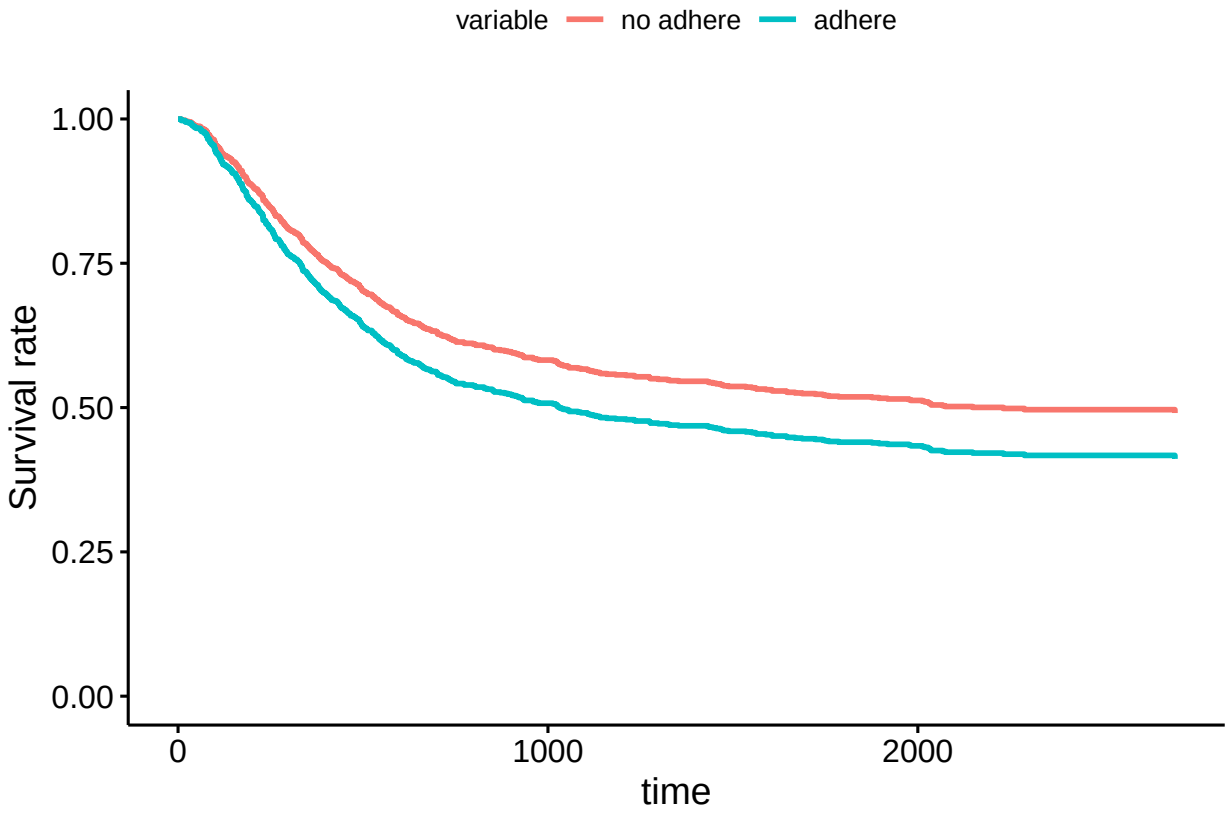
```
coef(cox)
```

```
## obstructobstruct     adhereadhere       nodes.ds>3     extentmuscle
##        0.1907457        0.2427379        0.7882497        0.3874735
##     extentserosa extentcontiguous
##        0.9572578        1.5064226
```

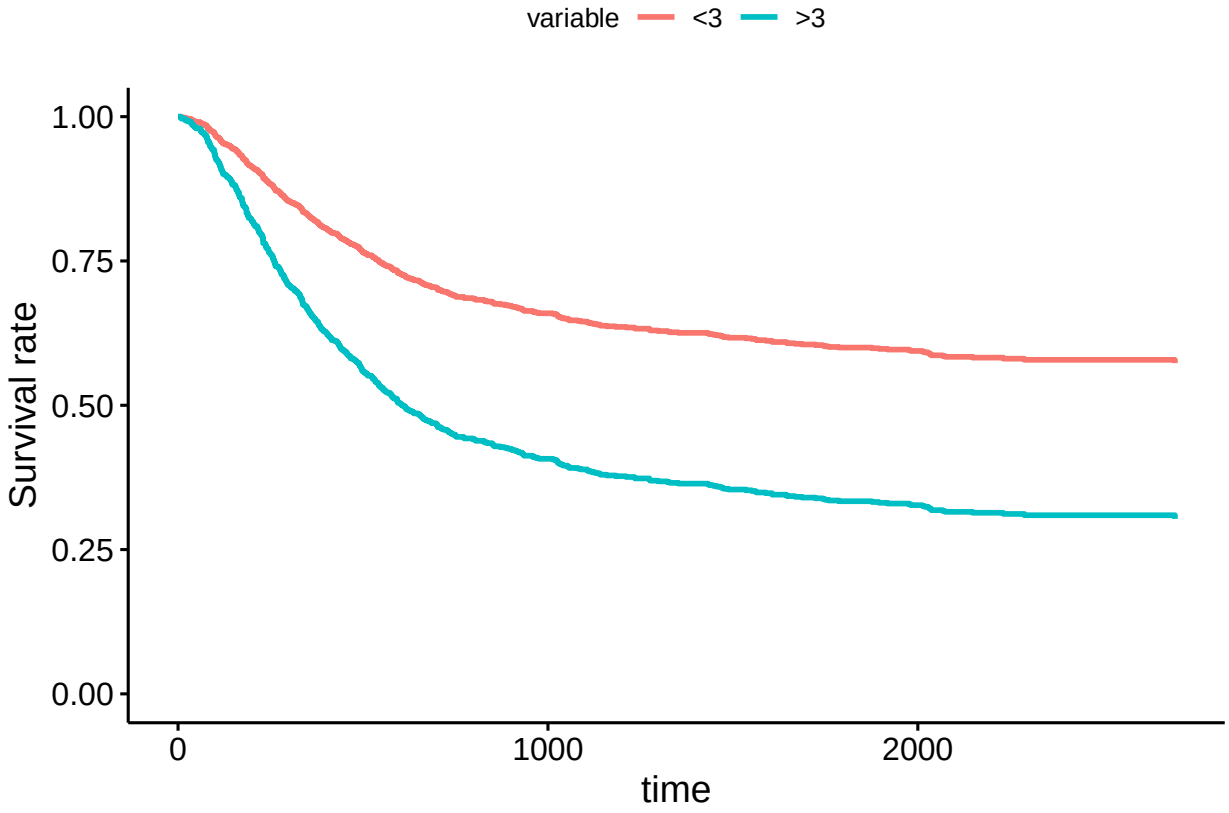
```
ggadjustedcurves(cox,data=colon_subset_recurrence,variable = "obstruct",conf.int = TRUE)
```



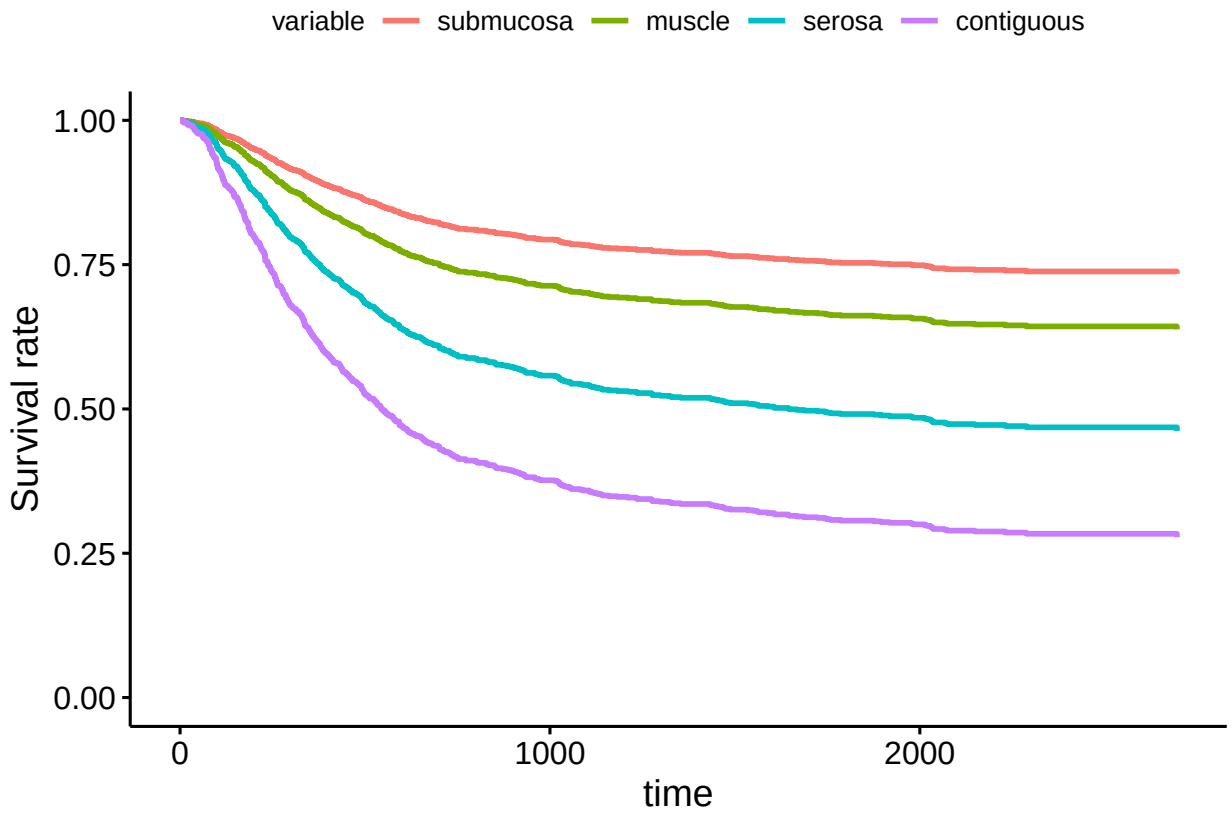

```
ggadjustedcurves(cox,data=colon_subset_recurrence,variable = "adhere",conf.int = TRUE)
```




```
ggadjustedcurves(cox,data=colon_subset_recurrence,variable = "nodes.ds",conf.int = TRUE)
```

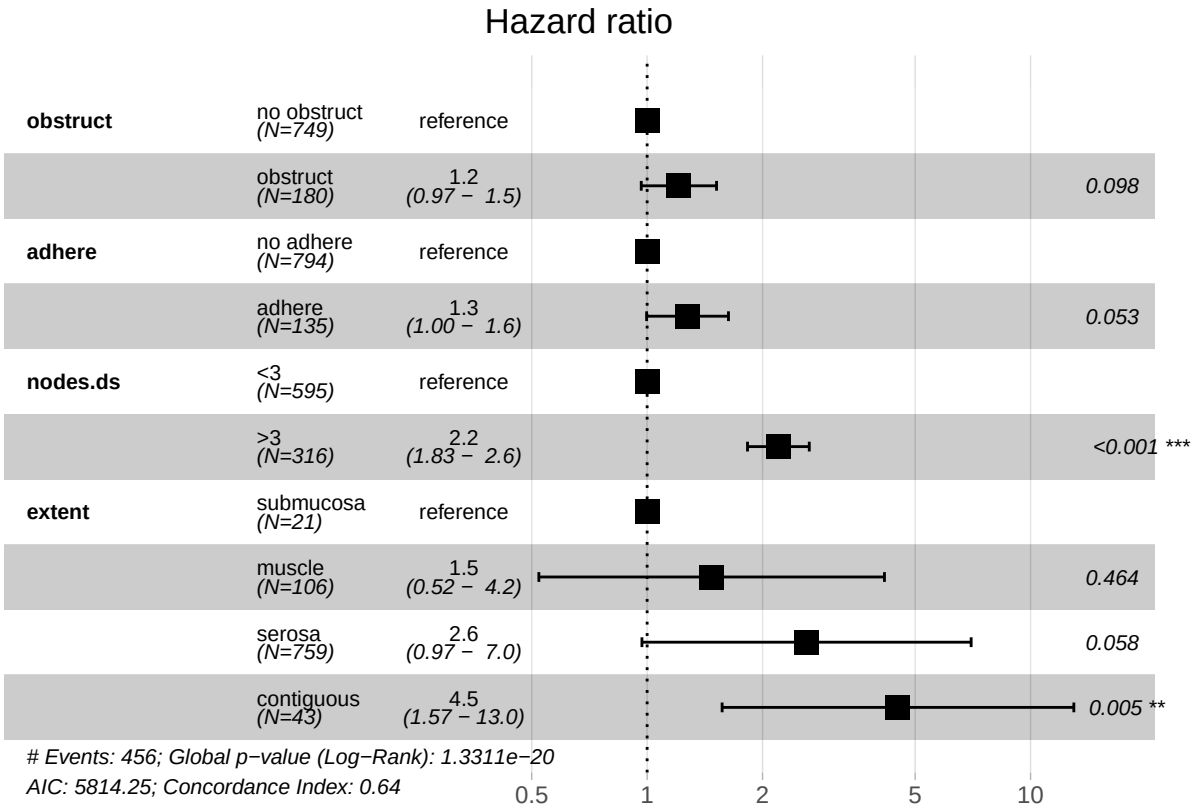


```
ggadjustedcurves(cox,data=colon_subset_recurrence,variable = "extent",conf.int = TRUE)
```




```
ggforest(cox, data = colon_subset_recurrence)
```

```
## Warning: Removed 4 rows containing missing values (geom_errorbar).
```




```
test.ph <- cox.zph(cox)
test.ph
```

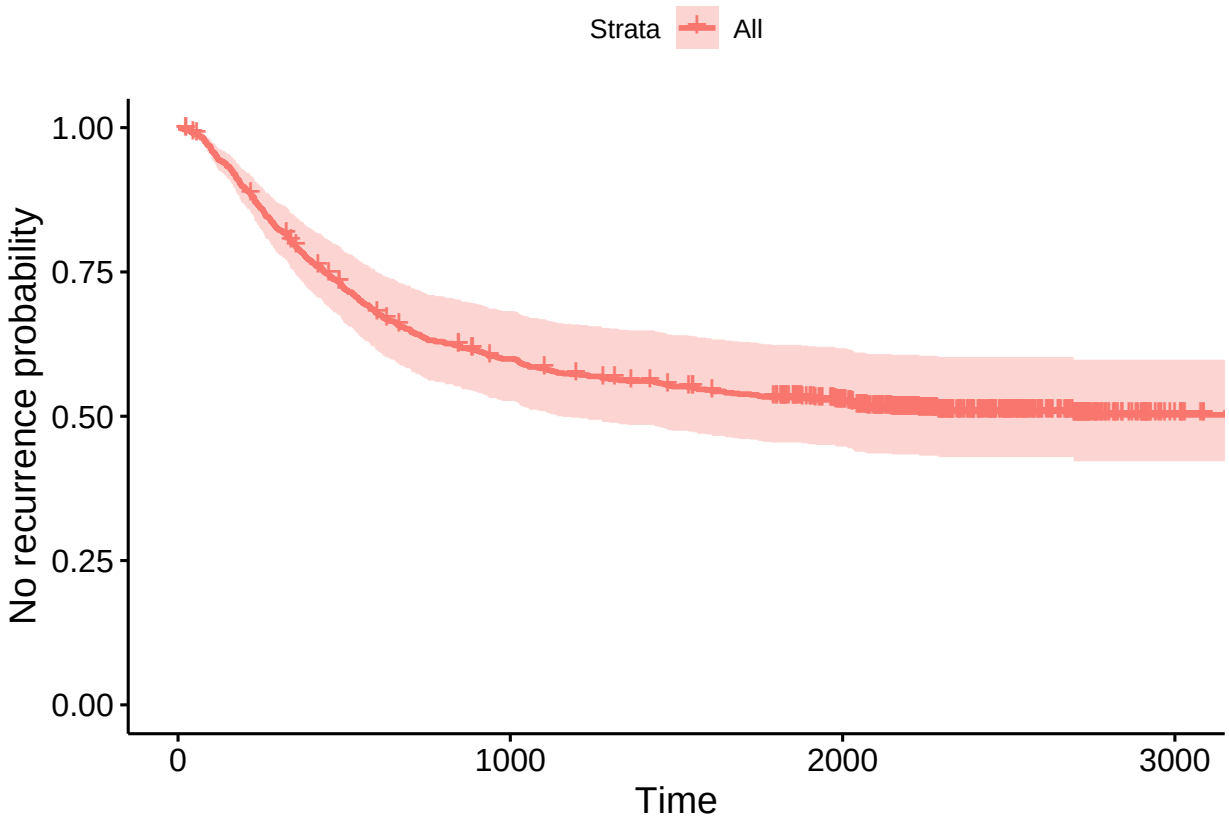
```
##                       rho    chisq        p
## obstructobstruct -0.11397 5.99e+00 1.43e-02
## adhereadhere      0.04949 1.11e+00 2.92e-01
## nodes.ds>3       -0.19418 1.67e+01 4.43e-05
## extentmuscle      0.00148 9.98e-04 9.75e-01
## extentserosa      0.01276 7.43e-02 7.85e-01
## extentcontiguous -0.00894 3.65e-02 8.49e-01
## GLOBAL                NA 2.44e+01 4.49e-04
```

create a new subject and see their survival curve

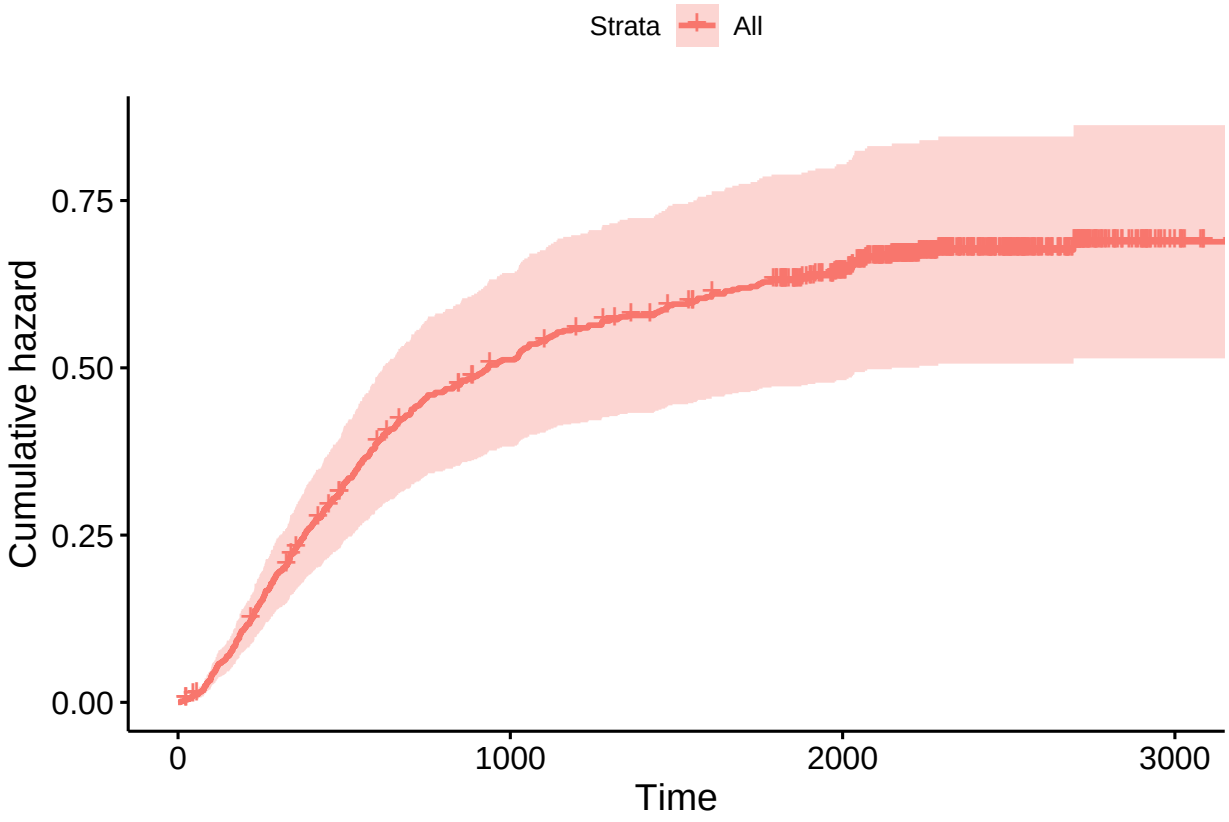
```
subject_one <- data.frame(obstruct = factor('no obstruct'), adhere = factor('adhere'), nodes.ds = factor
                          extent=factor('serosa'))
```

```
prediction_one <- survfit(cox, subject_one, data = colon_subset_recurrence)
```

```
ggsurvplot(prediction_one, ylab = "No recurrence probability")
```



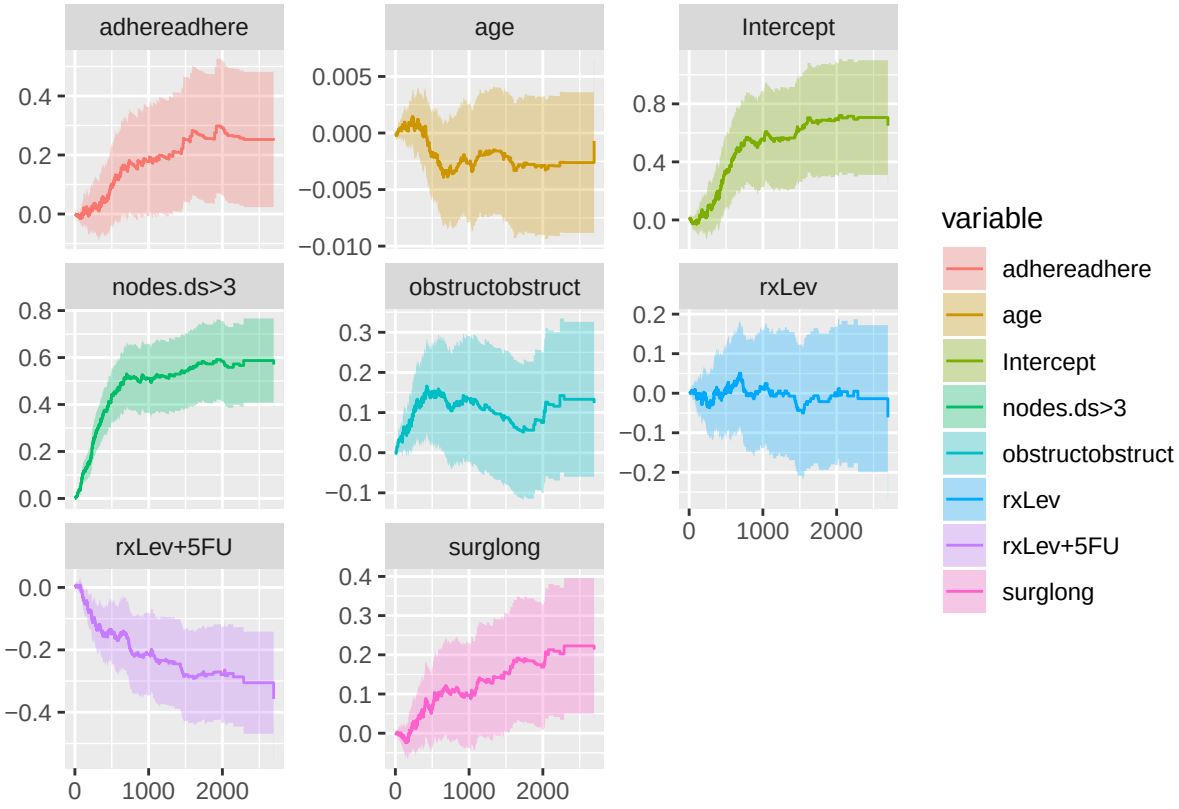

```
ggsurvplot(prediction_one, fun="cumhaz")
```



Aalen's additive regression model

```
aa_fit <- aareg(surv ~1 + obstruct + adhere + nodes.ds + surg + rx + age, data = colon_subset_recurrenc
```

```
autoplot(aa_fit)
```




```
summary(aa_fit)
```

```
## $table
##                          slope          coef     se(coef)          z
## Intercept          6.597051e-04  1.377027e-03 4.064307e-04  3.3880990
## obstructobstruct   2.227032e-04  3.443914e-04 1.968629e-04  1.7493973
## adhereadhere       2.365420e-04  4.920522e-04 2.279335e-04  2.1587532
## nodes.ds>3         8.565802e-04  1.379027e-03 1.811496e-04  7.6126428
## surglong           1.566790e-04  3.878978e-04 1.706020e-04  2.2736996
## rxLev             -5.158377e-06 -2.824746e-05 1.872186e-04 -0.1508795
## rxLev+5FU         -3.045652e-04 -6.412875e-04 1.661360e-04 -3.8600152
## age               -2.435937e-06 -4.691427e-06 6.387975e-06 -0.7344153
##                             p
## Intercept          7.037886e-04
## obstructobstruct   8.022236e-02
## adhereadhere       3.086932e-02
## nodes.ds>3         2.685473e-14
## surglong           2.298405e-02
## rxLev              8.800707e-01
## rxLev+5FU          1.133800e-04
## age                4.626957e-01
##
```

```
## $test
## [1] "aalen"
##
## $test.statistic
##        Intercept obstructobstruct     adhereadhere       nodes.ds>3
##        13.185956        15.070926        17.522066        83.902510
##         surglong            rxLev        rxLev+5FU              age
##        22.225231        -1.387123       -32.924325      -189.973929
##
## $test.var
##             b0
## b0   15.146459  -4.2233453    1.6837933  -3.3588005 -5.334958  -8.212835
##      -4.223345  74.2169205   -1.3006687   0.3969698 -4.690905   2.467741
##       1.683793  -1.3006687   65.8816791  -0.6391166 -2.534853  -2.415475
##      -3.358800   0.3969698   -0.6391166 121.4727883  7.007111  -1.419363
##      -5.334958  -4.6909046   -2.5348534   7.0071108 95.549050   6.417505
##      -8.212835   2.4677410   -2.4154748  -1.4193632  6.417505  84.521926
##      -5.315153  -1.1534131    2.0218232  -5.1914204  6.839721  45.191605
##    -942.534084 135.4896632 -234.8021720  54.8798699 80.436713 -19.197271
##
## b0   -5.315153  -942.53408
##      -1.153413   135.48966
##       2.021823  -234.80217
##      -5.191420    54.87987
##       6.839721    80.43671
##      45.191605   -19.19727
##      72.753808  -240.53670
##    -240.536700 66912.08626
##
## $test.var2
## NULL
##
## $chisq
##          [,1]
## [1,] 90.66855
##
## $n
## [1] 911 371 371
##
## attr(,"class")
## [1] "summary.aareg"
```

Accelerated failure time models

```
sr_fit = survreg(surv ~ 1 + obstruct + adhere + nodes.ds, dist="weibull",data=colon_subset_recurrence)
summary(sr_fit)
```

```
##
## Call:
## survreg(formula = surv ~ 1 + obstruct + adhere + nodes.ds, data = colon_subset_recurrence,
##     dist = "weibull")
##                    Value Std. Error     z      p
## (Intercept)       8.7024     0.1120 77.68 <2e-16
```

```
## obstructobstruct -0.3219     0.1632 -1.97 0.0486
## adhereadhere     -0.4852     0.1751 -2.77 0.0056
## nodes.ds>3       -1.1957     0.1379 -8.67 <2e-16
## Log(scale)        0.3487     0.0411  8.48 <2e-16
##
## Scale= 1.42
##
## Weibull distribution
## Loglik(model)= -3984.8   Loglik(intercept only)= -4028.2
##  Chisq= 86.89 on 3 degrees of freedom, p= 1e-18
## Number of Newton-Raphson Iterations: 5
## n=911 (18 observations deleted due to missingness)
```

create a new subject and see their survival curve

need to fix

```
subject_two = list(obstruct = factor('no obstruct'), adhere = factor('adhere'), nodes.ds = factor('<3'))

#prediction_two = survfit(sr_fit, subject_two, data = colon_subset_recurrence)
#plot(predict(sr_fit, newdata=subject_two,type="quantile",p=seq(.01,.99,by=.01)),seq(.99,.01,by=-.01),
#     col="red",type='l',xlab='time',ylab='Survival probability',main='Weibull')
detach(colon)
```