Colon Cancer

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Contents

1 RRPlot and the Colon data set

1.0.1 Libraries

```
library(survival)
library(FRESA.CAD)
```

```
## Loading required package: Rcpp
```

```
## Loading required package: stringr
```

```
## Loading required package: miscTools
```

```
## Loading required package: Hmisc
```

```
##
## Attaching package: 'Hmisc'
```

```
## The following objects are masked from 'package:base':
##
##     format.pval, units
```

```
## Loading required package: pROC
```

```
## Type 'citation("pROC")' for a citation.
```

```
##
## Attaching package: 'pROC'
```

```
## The following objects are masked from 'package:stats':
##
##     cov, smooth, var
```

```
#library(corrplot)
#source("~/GitHub/FRESA.CAD/R/RRPlot.R")
#source("~/GitHub/FRESA.CAD/R/PoissonEventRiskCalibration.R")
op <- par(no.readonly = TRUE)
pander::panderOptions('digits', 3)
```

```
#pander::panderOptions('table.split.table', 400)
pander::panderOptions('keep.trailing.zeros',TRUE)
```

1.1 The data set

```
data(cancer)
colon <- subset(colon,etype==1)
colon$etype <- NULL
rownames(colon) <- colon$id
colon$id <- NULL
colon <- colon[complete.cases(colon),]
time <- colon$time
status <- colon$status
data <- colon
data$time <- NULL
data$study <- NULL
table(data$status)
```

0 1 442 446

```
dataColon <- as.data.frame(model.matrix(status~.*age,data))
dataColon$`(Intercept)` <- NULL
dataColon$time <- time/365
dataColon$status <- status
colnames(dataColon) <-str_replace_all(colnames(dataColon),":","_")
colnames(dataColon) <-str_replace_all(colnames(dataColon),"\\.","_")
colnames(dataColon) <-str_replace_all(colnames(dataColon),"\\+","_")
data <- NULL

trainsamples <- sample(nrow(dataColon),0.7*nrow(dataColon))
dataColonTrain <- dataColon[trainsamples,]
dataColonTest <- dataColon[-trainsamples,]


pander::pander(table(dataColonTrain$status))
```

0	1
311	310

```
pander::pander(table(dataColonTest$status))
```

0	1
131	136

1.2 Modeling

```
ml <- BSWiMS.model(Surv(time,status)~1,data=dataColonTrain,NumberofRepeats = 10)
```

[+++-+++-+++-+++-++++++-++++++-+++-+++-]...

```
sm <- summary(ml)
pander::pander(sm$coefficients)
```

Table 3: Table continues below

	Estimate	lower	HR	upper	u.Accuracy
age_nodes	0.000423	1.000	1.000	1.001	0.607
node4	0.355981	1.260	1.428	1.617	0.601
rxLev_5FU_age	-0.004353	0.994	0.996	0.998	0.583
rxLev_5FU	-0.131937	0.824	0.876	0.932	0.583
age_node4	0.002206	1.001	1.002	1.003	0.601
extent	0.175181	1.047	1.191	1.356	0.536
nodes	0.009276	1.002	1.009	1.017	0.605
adhere	0.067181	1.008	1.069	1.135	0.536

Table 4: Table continues below

	r.Accuracy	full.Accuracy	u.AUC	r.AUC	full.AUC
age_nodes	0.520	0.606	0.607	0.520	0.606
node4	0.599	0.615	0.600	0.599	0.615
rxLev_5FU_age	0.607	0.615	0.583	0.607	0.615
rxLev_5FU	0.601	0.616	0.583	0.600	0.615
age_node4	0.608	0.616	0.600	0.608	0.615
extent	0.601	0.615	0.537	0.600	0.615
nodes	0.596	0.616	0.605	0.596	0.615
adhere	0.609	0.606	0.536	0.608	0.606

	IDI	NRI	z.IDI	z.NRI	Delta.AUC	Frequency
age_nodes	0.02968	0.409	5.80	5.51	0.08602	1.0
node4	0.03732	0.401	5.60	5.89	0.01623	1.0
rxLev_5FU_age	0.02491	0.333	4.58	4.49	0.00867	1.0
rxLev_5FU	0.02160	0.333	4.24	4.49	0.01510	1.0
age_node4	0.01309	0.355	3.92	5.37	0.00764	1.0
extent	0.00926	0.147	2.66	2.84	0.01517	1.0
nodes	0.00420	0.207	2.44	2.73	0.01945	1.0
adhere	0.00470	0.143	2.22	2.49	-0.00260	0.9

1.3 Cox Model Performance

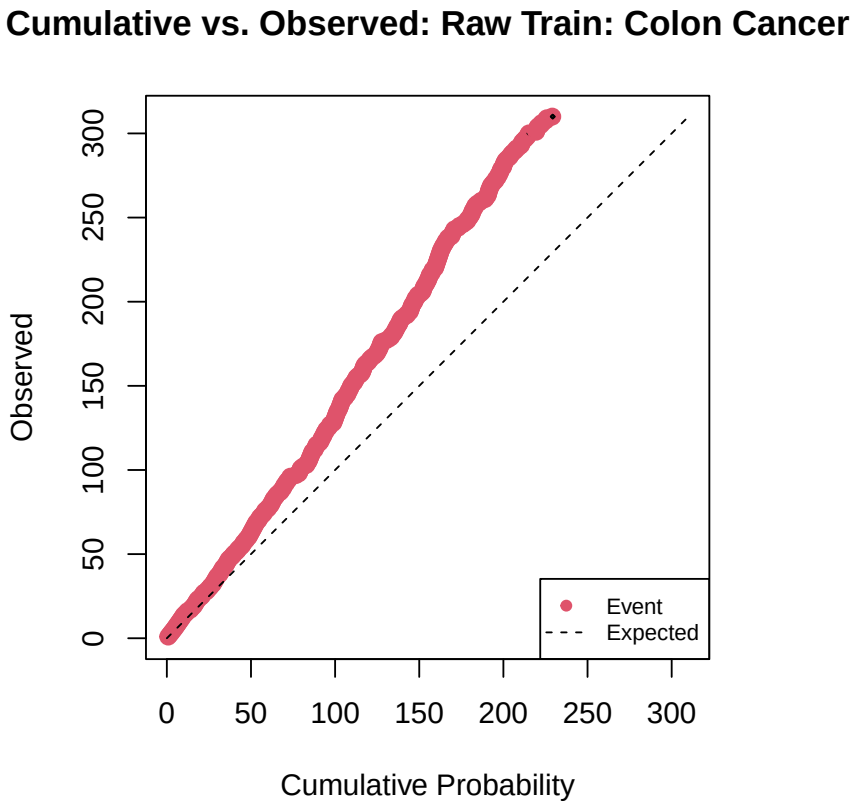
Here we evaluate the model using the RRPlot() function.

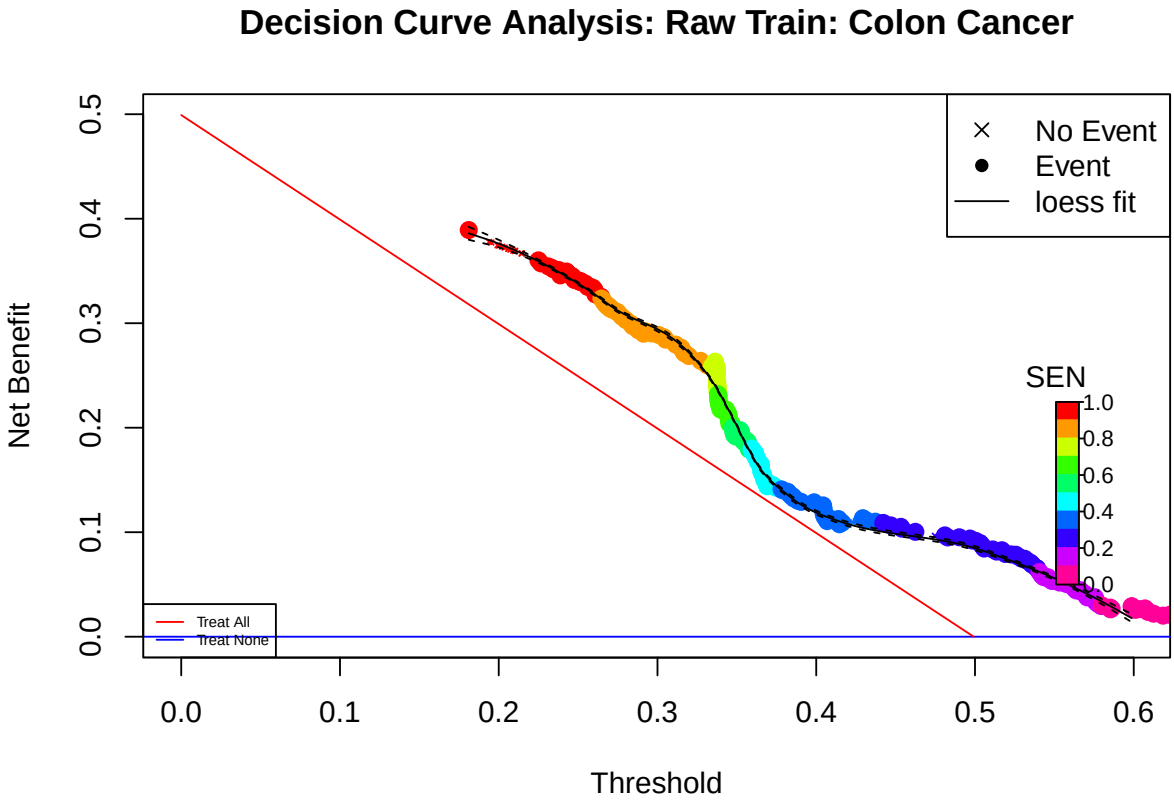
1.3.1 The evaluation of the raw Cox model with RRPlot()

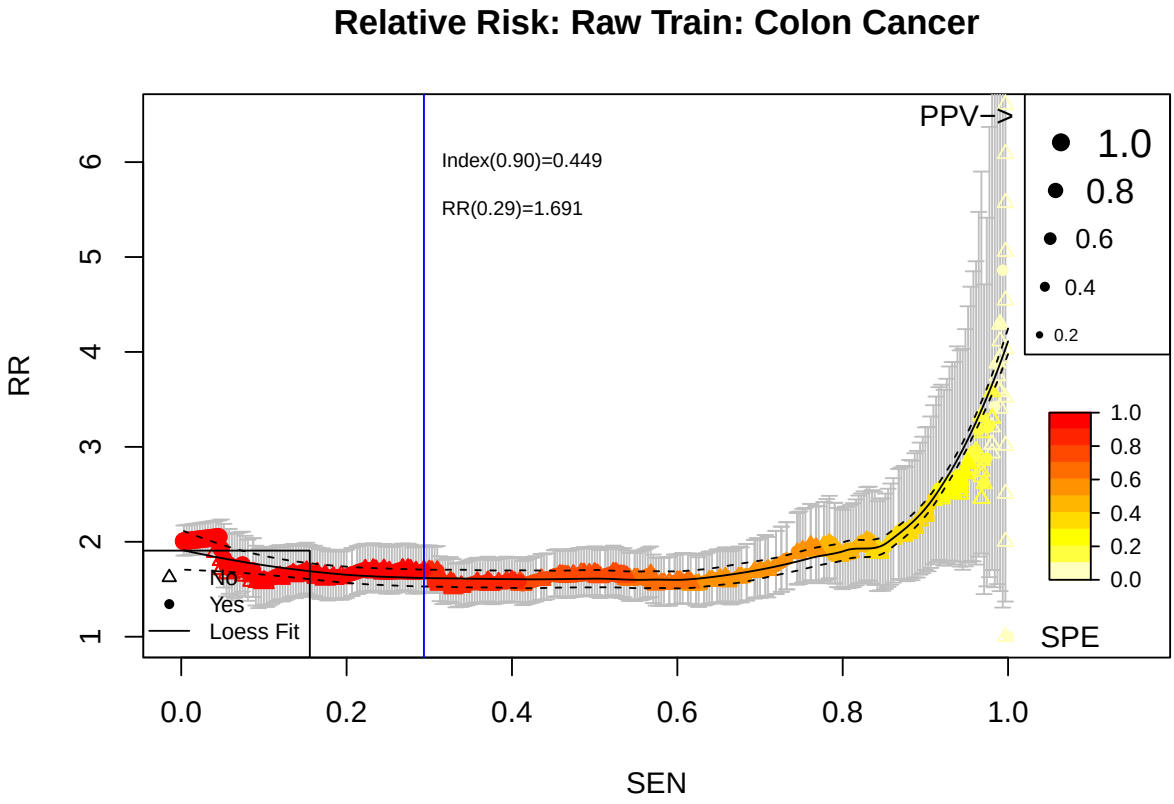
Here we will use the predicted event probability assuming a baseline hazard for events withing 5 years

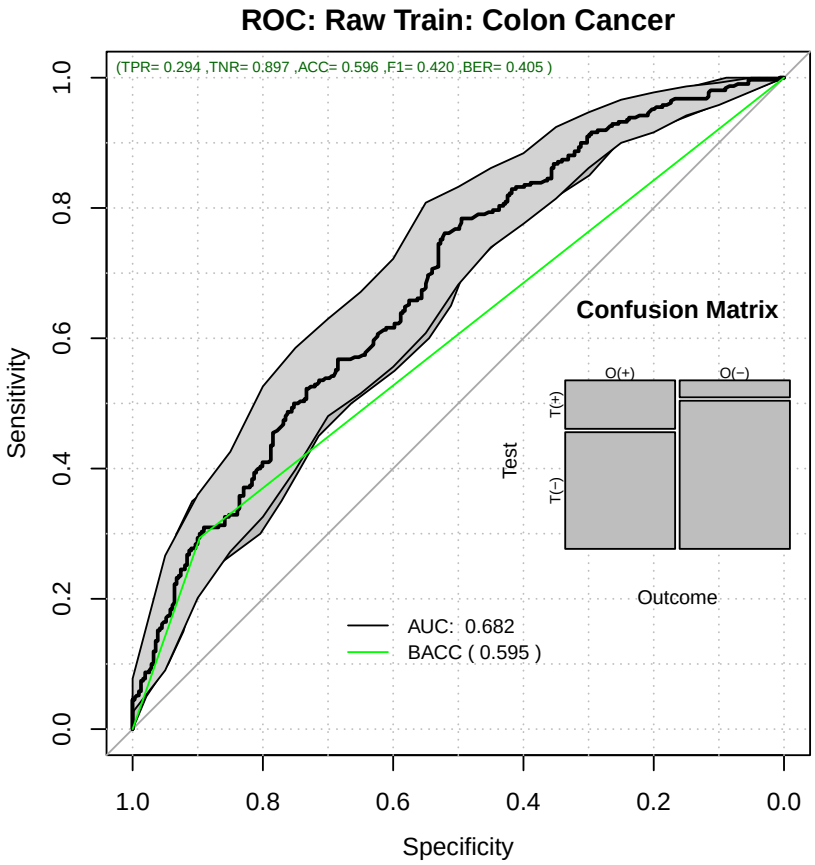
```
index <- predict(ml,dataColonTrain)
timeinterval <- 2*mean(subset(dataColonTrain,status==1)$time)

h0 <- sum(dataColonTrain$status & dataColonTrain$time <= timeinterval)
h0 <- h0/sum((dataColonTrain$time > timeinterval) | (dataColonTrain$status==1))
```

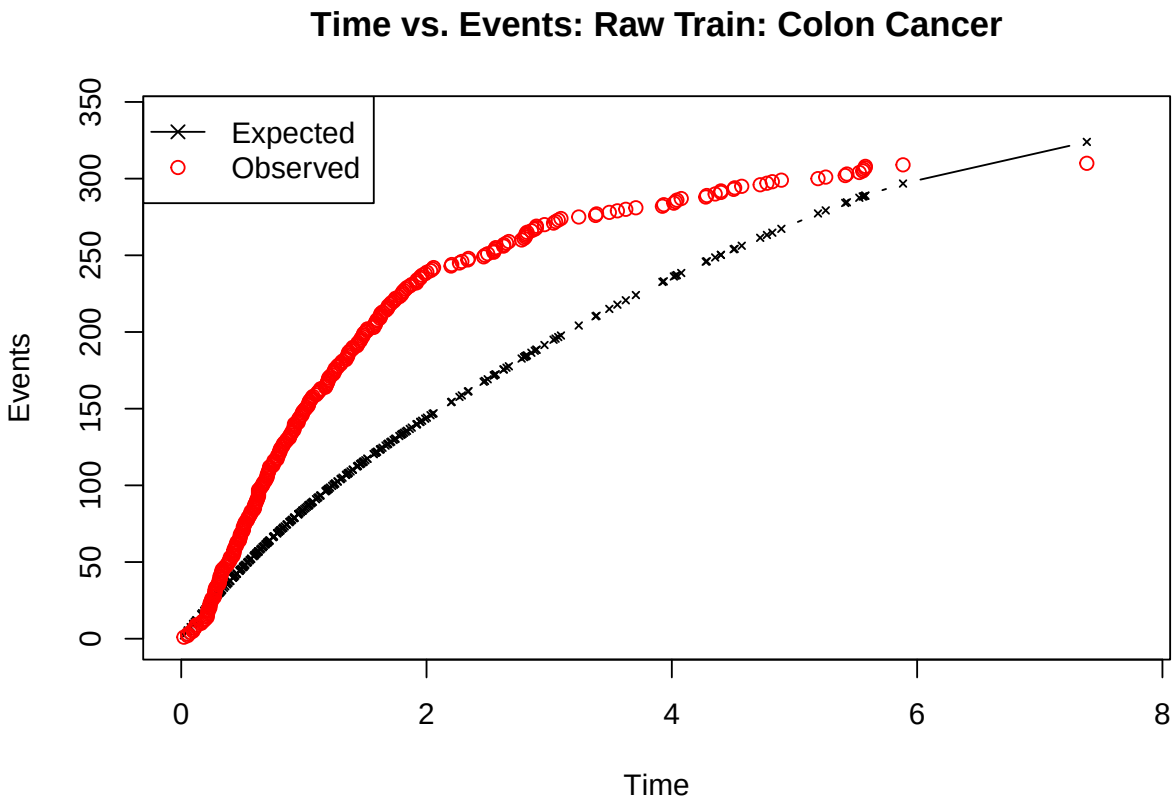
```
rdata <- cbind(dataColonTrain$status,ppoisGzero(index,h0))

rrAnalysisTrain <- RRPlot(rdata,atProb=c(0.90),
                      timetoEvent=dataColonTrain$time,
                      title="Raw Train: Colon Cancer",
                      ysurvlim=c(0.00,1.0),
                      riskTimeInterval=timeinterval)
```

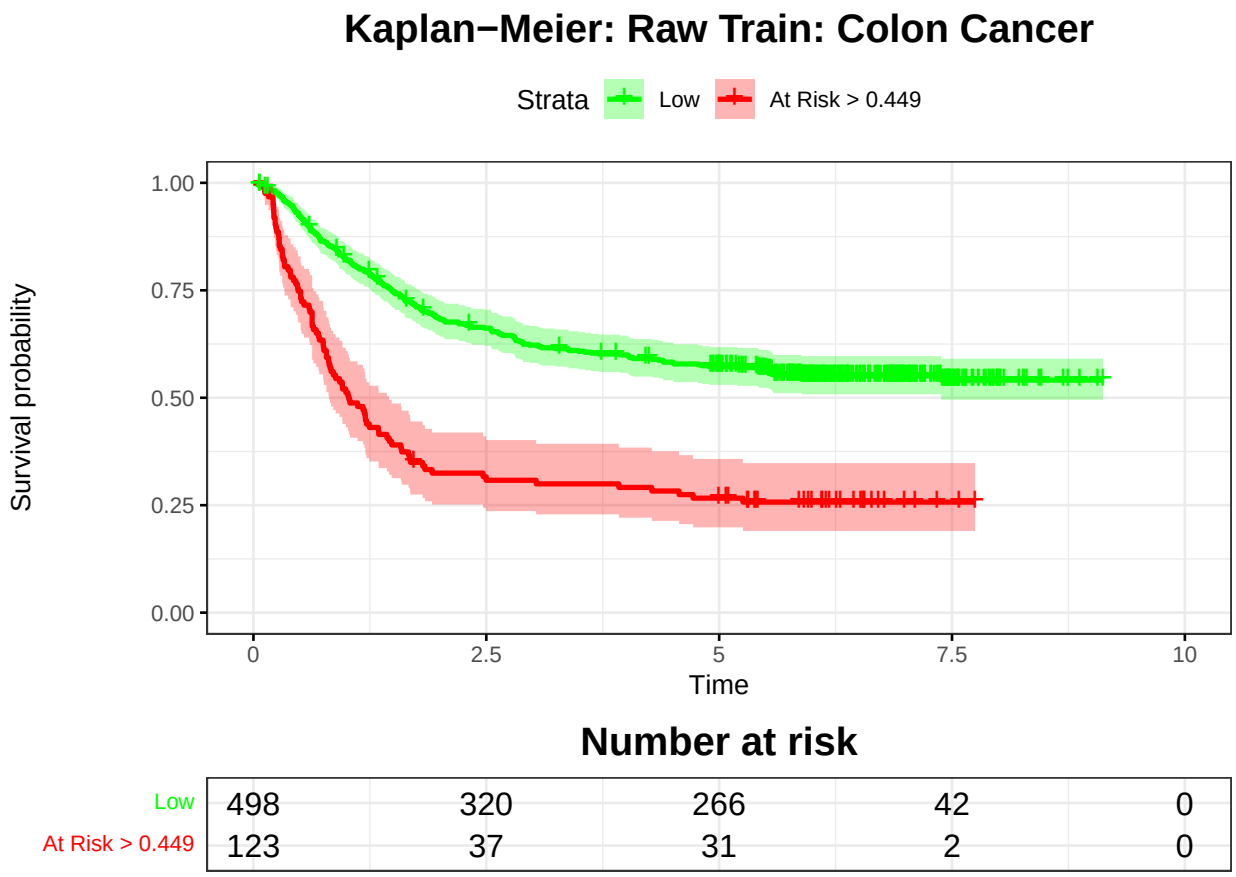



Decision Curve Analysis: Raw Train: Colon Cancer
Net Benefit
Threshold
0.0
0.1
0.2
0.3
0.4
0.5
0.6
No Event
Event
loess fit
SEN
1.0
0.8
0.6
0.4
0.2
0.0
Treat All
Treat None


Relative Risk: Raw Train: Colon Cancer
PPV–>
Index(0.90)=0.449
RR(0.29)=1.691
1.0
0.8
0.6
0.4
0.2
1.0
0.8
0.6
0.4
0.2
0.0
SPE
No
Yes
Loess Fit
RR
SEN
1
2
3
4
5
6
0.0
0.2
0.4
0.6
0.8
1.0


ROC: Raw Train: Colon Cancer
(TPR= 0.294 ,TNR= 0.897 ,ACC= 0.596 ,F1= 0.420 ,BER= 0.405)
Sensitivity
Specificity
1.0
0.8
0.6
0.4
0.2
0.0
Confusion Matrix
O(+)
O(−)
T(+)
T(−)
Test
Outcome
AUC: 0.682
BACC (0.595)


Time vs. Events: Raw Train: Colon Cancer
Expected
Observed
Events
0
50
100
150
200
250
300
350
0
2
4
6
8
Time



1.3.2 Uncalibrated Performance Report

```
pander::pander(t(rrAnalysisTrain$keyPoints),caption="Threshold values")
```

Table 6: Threshold values

	@:0.9	@MAX_BACC	@MAX_RR	@SPE100	p(0.5)
Thr	0.449	0.337	0.238	0.18110	0.501
RR	1.682	1.955	3.582	1.00000	1.717
SEN	0.294	0.761	0.981	1.00000	0.268
SPE	0.897	0.521	0.113	0.00643	0.916
BACC	0.595	0.641	0.547	0.50322	0.592

```
pander::pander(t(rrAnalysisTrain$OERatio$estimate),caption="O/E Ratio")
```

Table 7: O/E Ratio

O/E	Low	Upper	p.value
0.957	0.853	1.07	0.453

```
pander::pander(t(rrAnalysisTrain$OE95ci),caption="O/E Mean")
```

Table 8: O/E Mean

mean	50%	2.5%	97.5%
1.57	1.57	1.54	1.59

```
pander::pander(t(rrAnalysisTrain$OAcum95ci),caption="O/Acum Mean")
```

Table 9: O/Acum Mean

mean	50%	2.5%	97.5%
1.35	1.35	1.35	1.36

```
pander::pander(rrAnalysisTrain$c.index$cstatCI,caption="C. Index")
```

mean.C Index	median	lower	upper
0.656	0.656	0.627	0.69

```
pander::pander(t(rrAnalysisTrain$ROCAnalysis$aucs),caption="ROC AUC")
```

Table 11: ROC AUC

est	lower	upper
0.682	0.641	0.724

```
pander::pander((rrAnalysisTrain$ROCAnalysis$sensitivity),caption="Sensitivity")
```

Table 12: Sensitivity

est	lower	upper
0.294	0.243	0.348

```
pander::pander((rrAnalysisTrain$ROCAnalysis$specificity),caption="Specificity")
```

Table 13: Specificity

est	lower	upper
0.897	0.858	0.929

```
pander::pander(t(rrAnalysisTrain$thr_atP),caption="Probability Thresholds")
```

Table 14: Probability Thresholds

90%	at_max_BACC	at_max_RR	atSPE100	at_0.5
0.449	0.337	0.238	0.181	0.5

```
pander::pander(t(rrAnalysisTrain$RR_atP),caption="Risk Ratio")
```

Table 15: Risk Ratio

est	lower	upper
1.69	1.46	1.95

```
pander::pander(rrAnalysisTrain$surdif,caption="Logrank test")
```

Table 16: Logrank test Chisq = 63.453880 on 1 degrees of freedom, p = 0.000000

	N	Observed	Expected	(O-E)^2/E	(O-E)^2/V
class=0	498	219	267.2	8.69	63.5
class=1	123	91	42.8	54.21	63.5

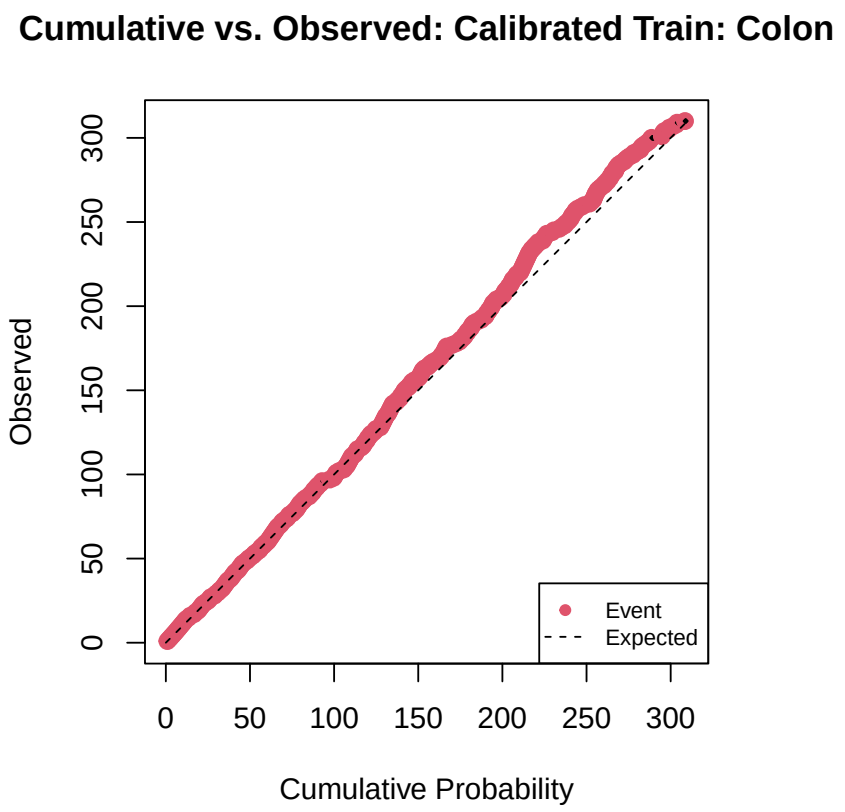
1.3.3 Cox Calibration

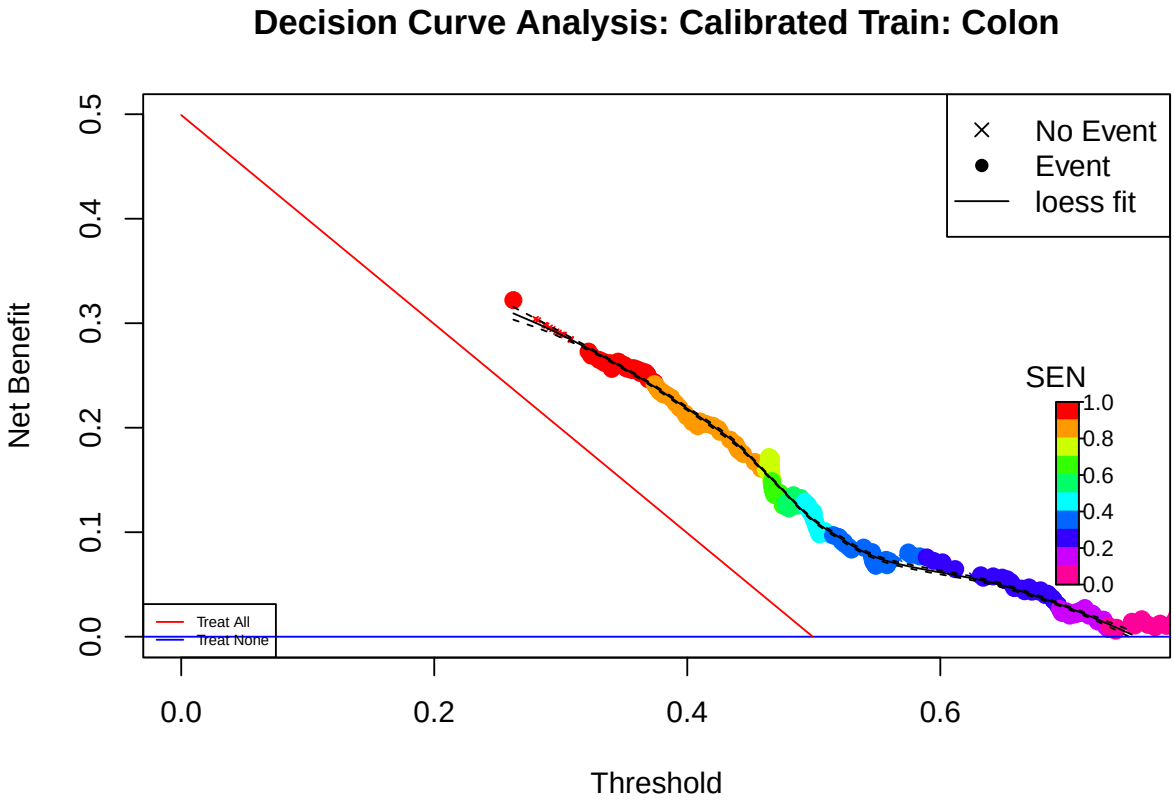
```
op <- par(no.readonly = TRUE)


calprob <- CoxRiskCalibration(ml,dataColonTrain,"status","time")

pander::pander(c(h0=calprob$h0,
                 Gain=calprob$hazardGain,
                 DeltaTime=calprob$timeInterval),
               caption="Cox Calibration Parameters")
```

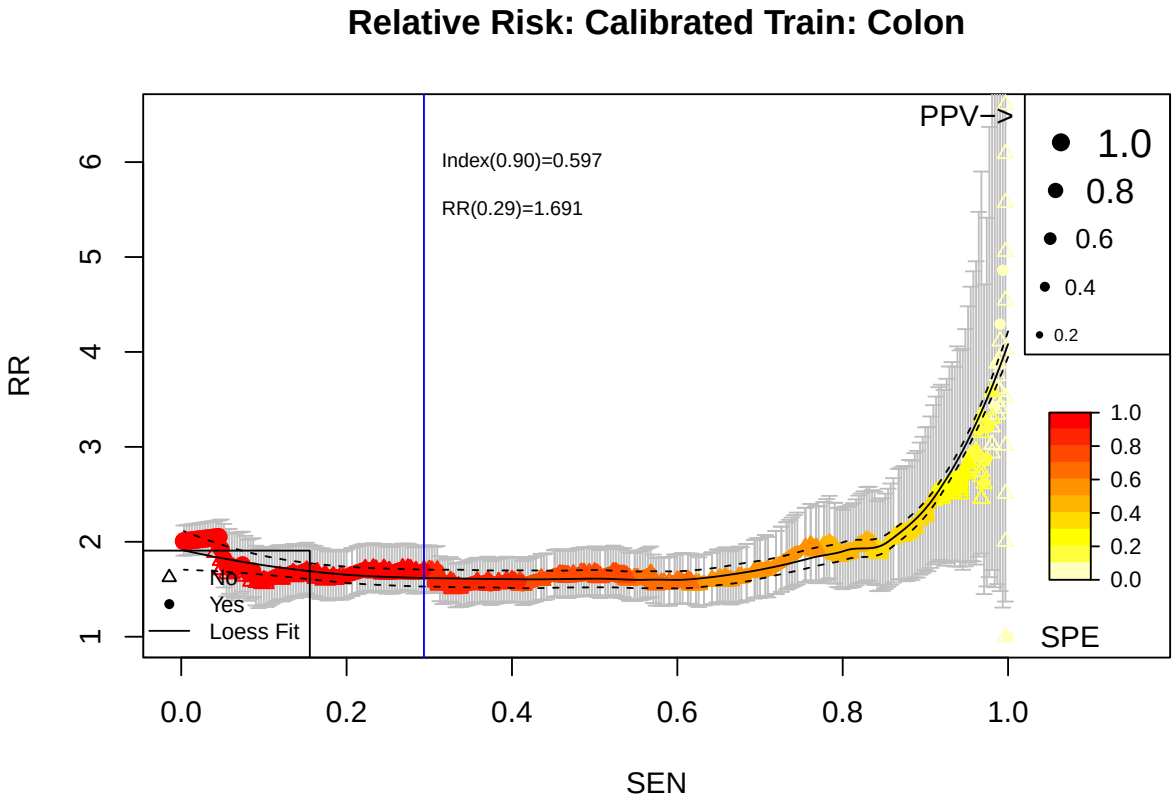
h0	Gain	DeltaTime
0.677	1.52	2.87

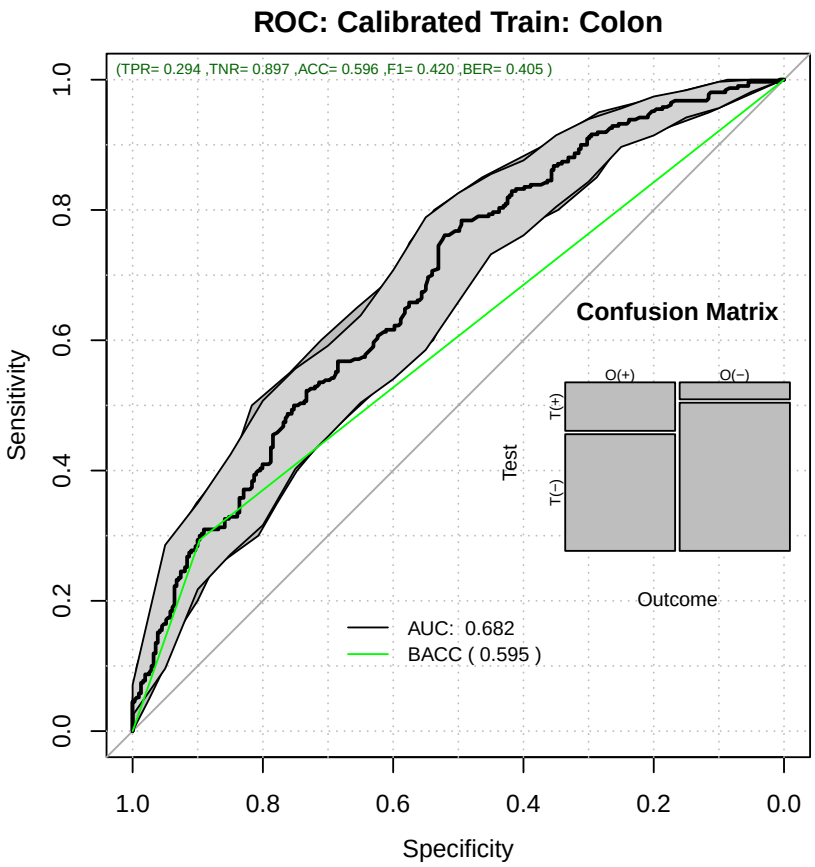
1.3.4 The RRplot() of the calibrated model

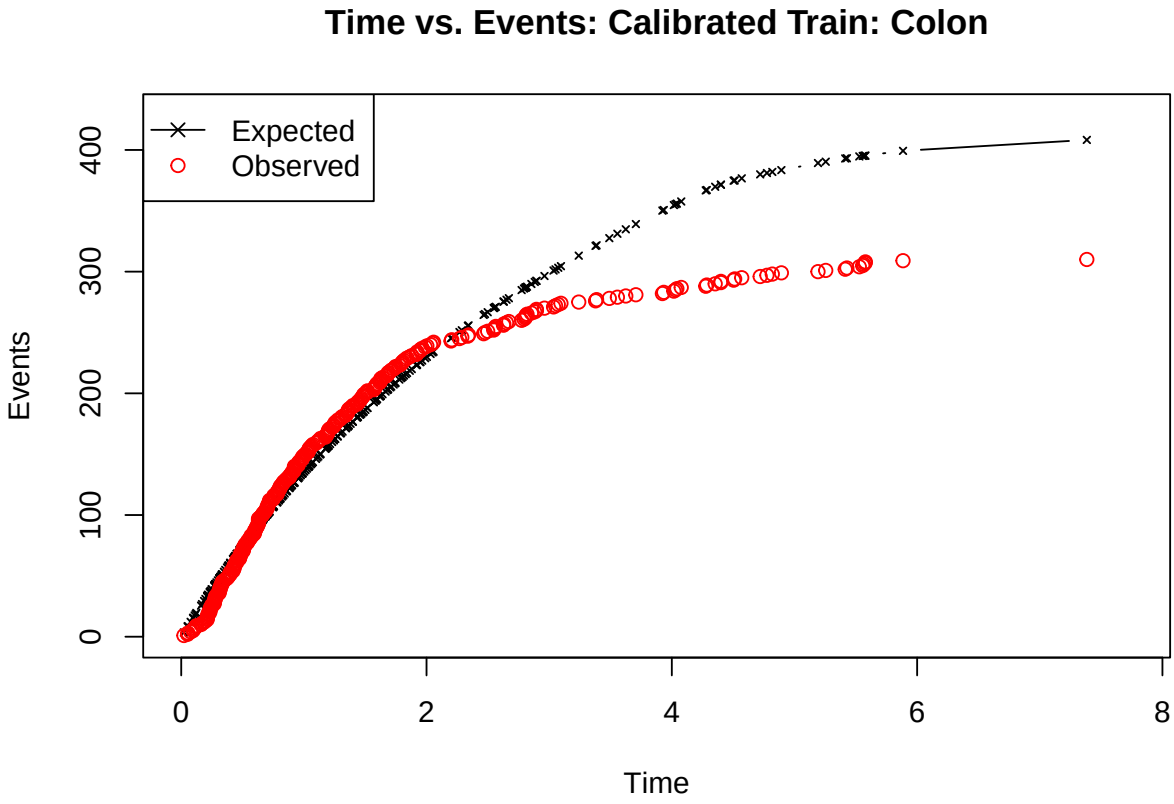
```
h0 <- calprob$h0
timeinterval <- calprob$timeInterval;

rdata <- cbind(dataColonTrain$status,calprob$prob)


rrAnalysisTrain <- RRPlot(rdata,atProb=c(0.90),
                      timetoEvent=dataColonTrain$time,
                      title="Calibrated Train: Colon",
                      ysurvlim=c(0.00,1.0),
                      riskTimeInterval=timeinterval)
```

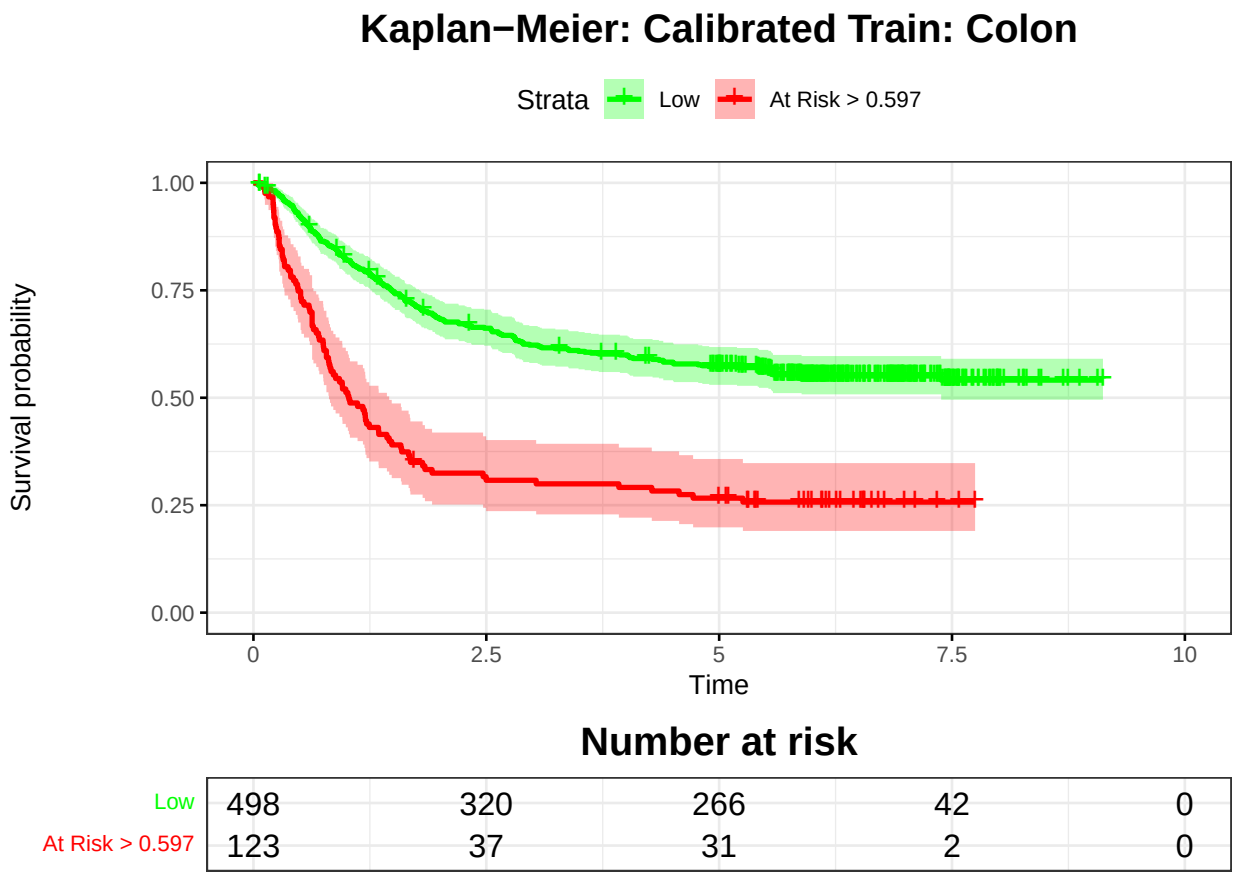

Cumulative vs. Observed: Calibrated Train: Colon
Observed
0
50
100
150
200
250
300
Cumulative Probability
Event
Expected


Decision Curve Analysis: Calibrated Train: Colon
Net Benefit
0.0
0.1
0.2
0.3
0.4
0.5
0.0
0.2
0.4
0.6
Threshold
No Event
Event
loess fit
SEN
1.0
0.8
0.6
0.4
0.2
0.0
Treat All
Treat None


Relative Risk: Calibrated Train: Colon
PPV–>
Index(0.90)=0.597
RR(0.29)=1.691
1.0
0.8
0.6
0.4
0.2
1.0
0.8
0.6
0.4
0.2
0.0
SPE
No
Yes
Loess Fit
RR
SEN
1
2
3
4
5
6
0.0
0.2
0.4
0.6
0.8
1.0


ROC: Calibrated Train: Colon
(TPR= 0.294 ,TNR= 0.897 ,ACC= 0.596 ,F1= 0.420 ,BER= 0.405)
Sensitivity
Specificity
1.0
0.8
0.6
0.4
0.2
0.0
Confusion Matrix
O(+)
O(−)
T(+)
T(−)
Test
Outcome
AUC: 0.682
BACC (0.595)


Time vs. Events: Calibrated Train: Colon
Expected
Observed
Events
0
100
200
300
400
0
2
4
6
8
Time



1.3.5 Calibrated Train Performance

```
pander::pander(t(rrAnalysisTrain$keyPoints),caption="Threshold values")
```

Table 18: Threshold values

	@:0.9	@MAX_BACC	@MAX_RR	@SPE100	p(0.5)
Thr	0.597	0.466	0.339	0.26253	0.500
RR	1.682	1.955	3.582	1.00000	1.619
SEN	0.294	0.761	0.981	1.00000	0.442
SPE	0.897	0.521	0.113	0.00643	0.785
BACC	0.595	0.641	0.547	0.50322	0.613

```
pander::pander(t(rrAnalysisTrain$OERatio$estimate),caption="O/E Ratio")
```

Table 19: O/E Ratio

O/E	Low	Upper	p.value
0.759	0.677	0.849	4.37e-07

```
pander::pander(t(rrAnalysisTrain$OE95ci),caption="O/E Mean")
```

Table 20: O/E Mean

mean	50%	2.5%	97.5%
0.982	0.982	0.969	0.995

```
pander::pander(t(rrAnalysisTrain$OAcum95ci),caption="O/Acum Mean")
```

Table 21: O/Acum Mean

mean	50%	2.5%	97.5%
1.03	1.03	1.03	1.03

```
pander::pander(rrAnalysisTrain$c.index$cstatCI,caption="C. Index")
```

mean.C Index	median	lower	upper
0.656	0.656	0.625	0.686

```
pander::pander(t(rrAnalysisTrain$ROCAnalysis$aucs),caption="ROC AUC")
```

Table 23: ROC AUC

est	lower	upper
0.682	0.641	0.724

```
pander::pander((rrAnalysisTrain$ROCAnalysis$sensitivity),caption="Sensitivity")
```

Table 24: Sensitivity

est	lower	upper
0.294	0.243	0.348

```
pander::pander((rrAnalysisTrain$ROCAnalysis$specificity),caption="Specificity")
```

Table 25: Specificity

est	lower	upper
0.897	0.858	0.929

```
pander::pander(t(rrAnalysisTrain$thr_atP),caption="Probability Thresholds")
```

Table 26: Probability Thresholds

90%	at_max_BACC	at_max_RR	atSPE100	at_0.5
0.597	0.466	0.339	0.263	0.5

```
pander::pander(t(rrAnalysisTrain$RR_atP),caption="Risk Ratio")
```

Table 27: Risk Ratio

est	lower	upper
1.69	1.46	1.95

```
pander::pander(rrAnalysisTrain$surdif,caption="Logrank test")
```

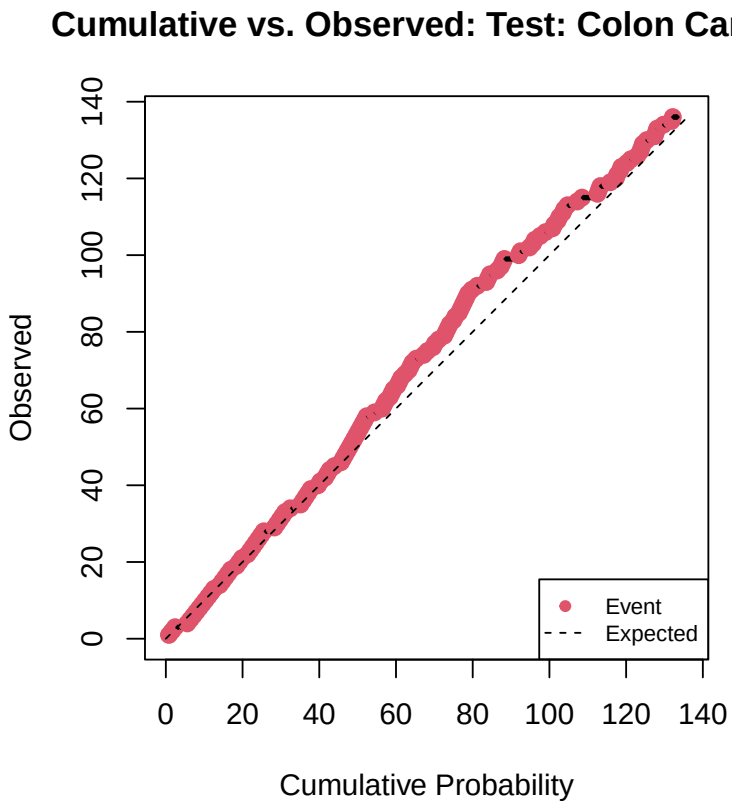
Table 28: Logrank test Chisq = 63.453880 on 1 degrees of freedom, p = 0.000000

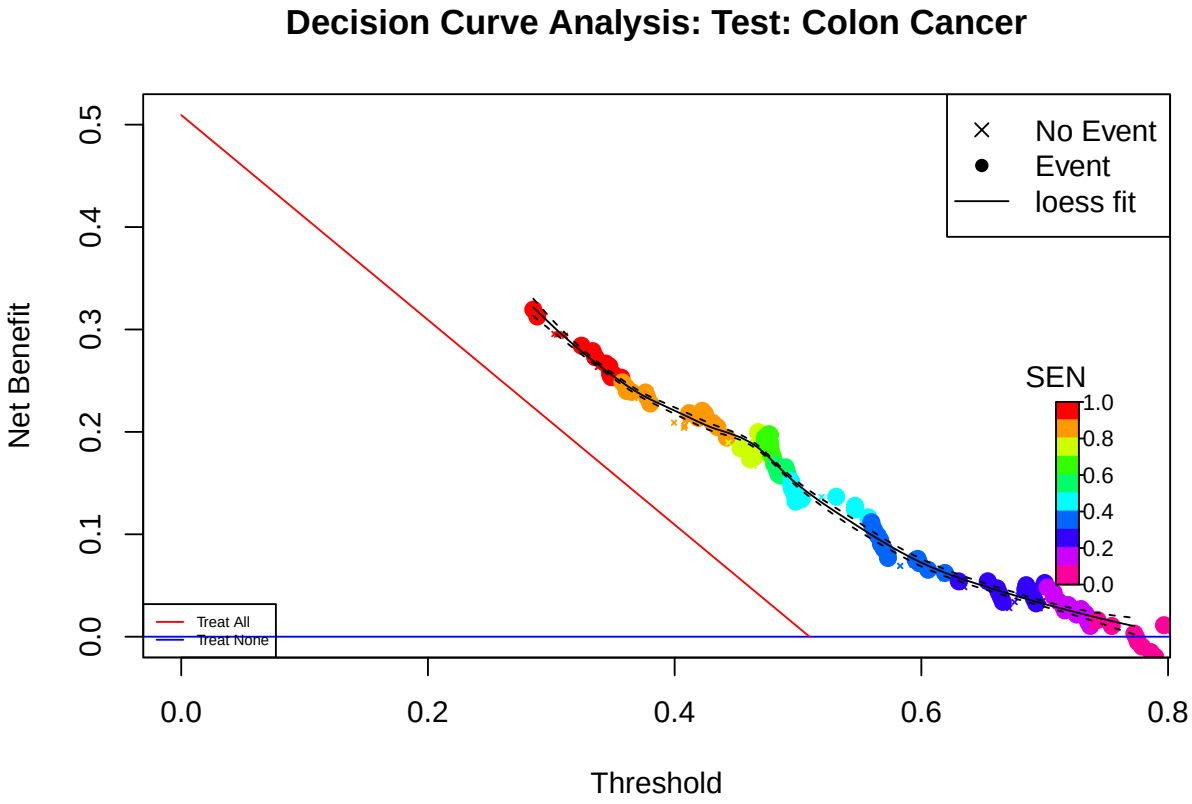
	N	Observed	Expected	(O-E)^2/E	(O-E)^2/V
class=0	498	219	267.2	8.69	63.5
class=1	123	91	42.8	54.21	63.5

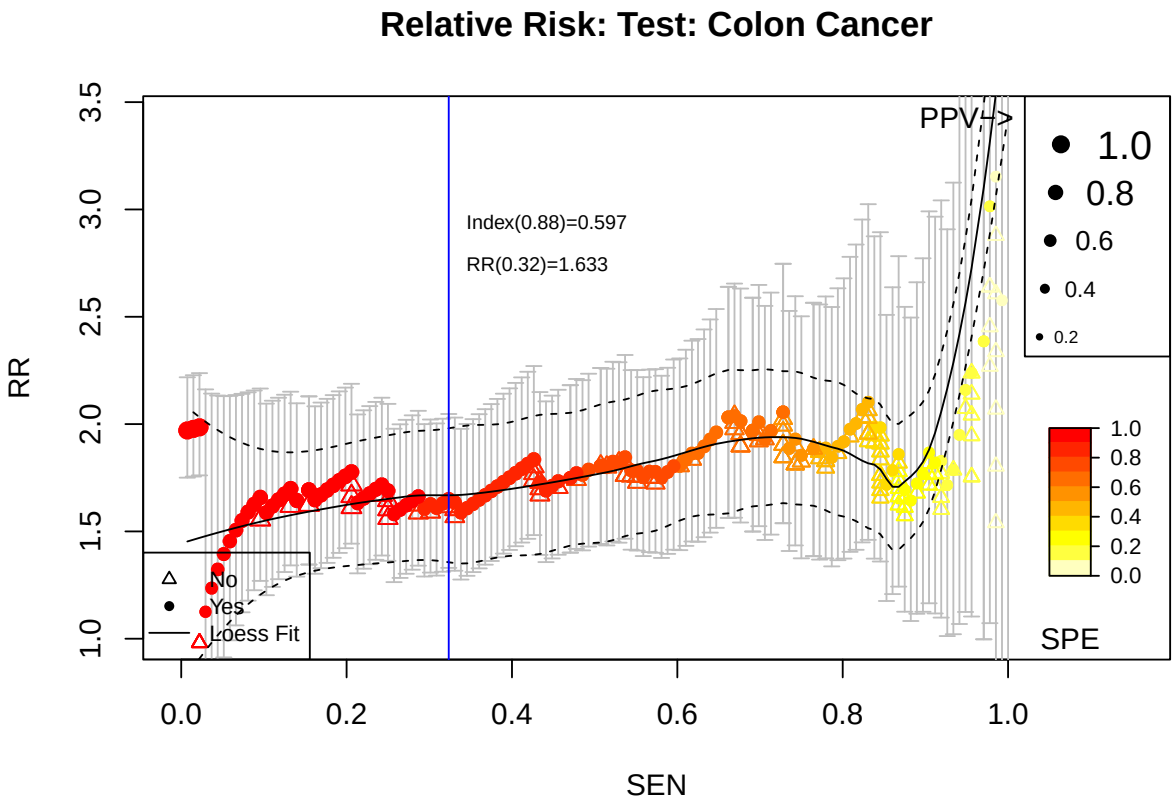
1.3.6 Evaluating on the test set

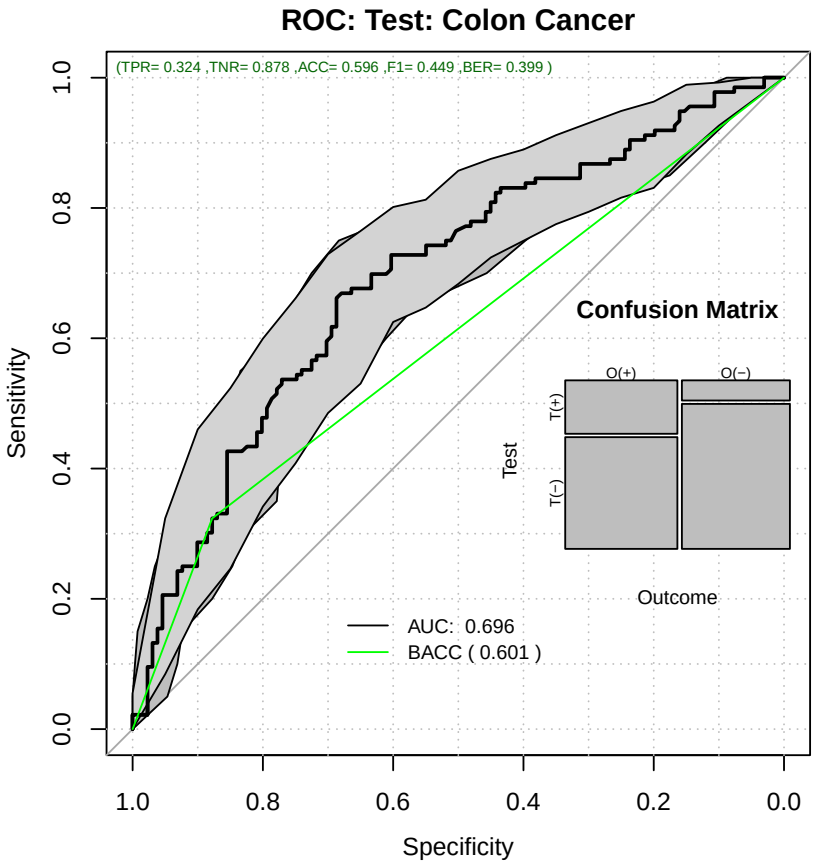
The calibrated h0 and timeinterval were estimated on the training set

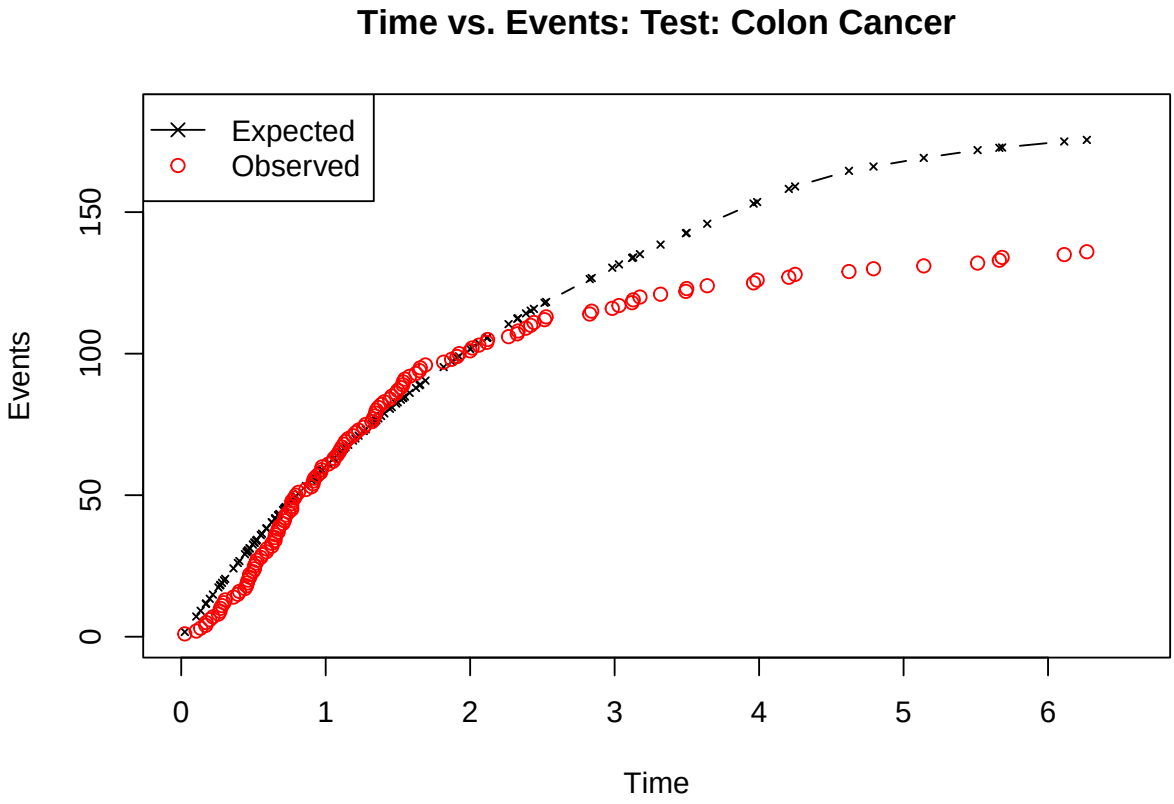
```
index <- predict(ml,dataColonTest)
rdata <- cbind(dataColonTest$status,ppoisGzero(index,h0))

rrAnalysisTest <- RRPlot(rdata,atThr = rrAnalysisTrain$thr_atP,
                     timetoEvent=dataColonTest$time,
                     title="Test: Colon Cancer",
                     ysurvlim=c(0.00,1.0),
                     riskTimeInterval=timeinterval)
```

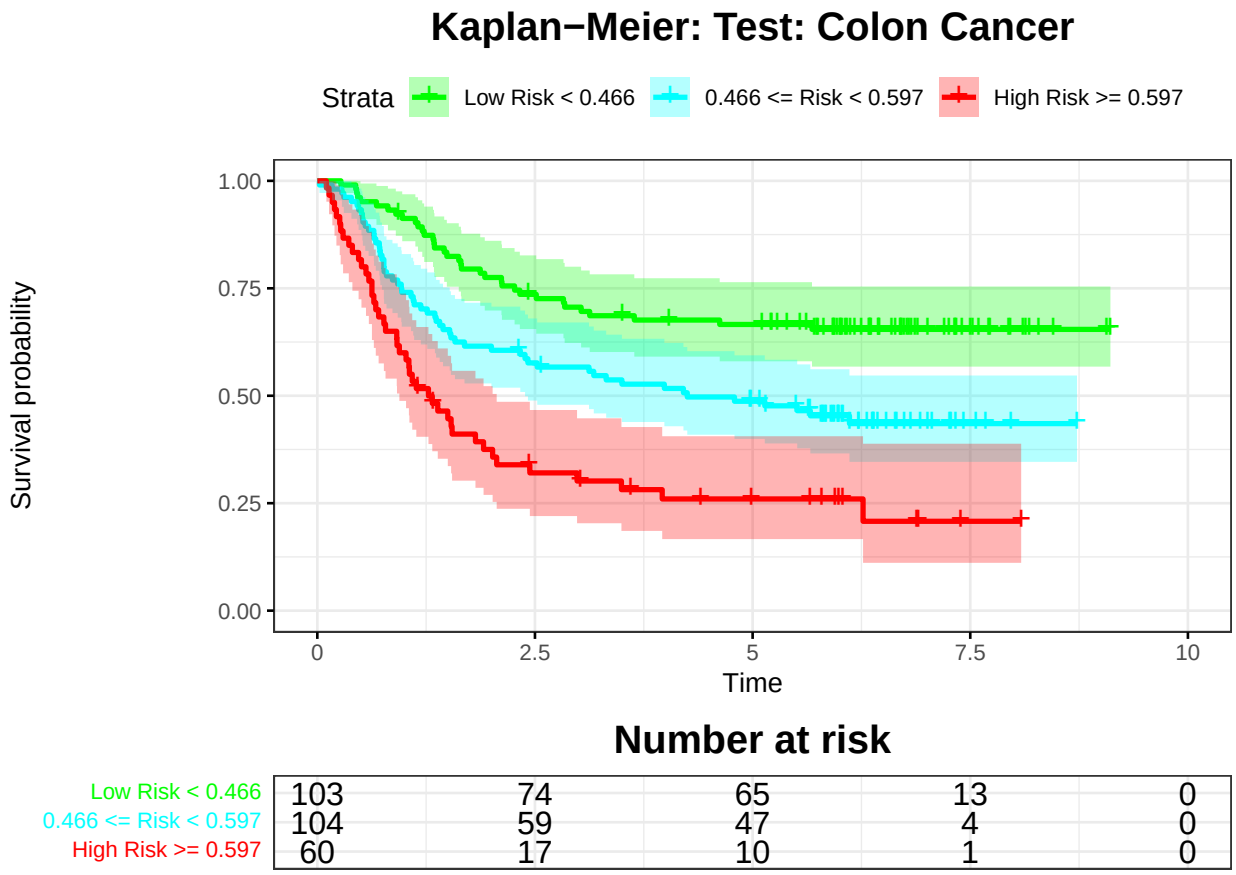

Cumulative vs. Observed: Test: Colon Cancer
Observed
0
20
40
60
80
100
120
140
Cumulative Probability
Event
Expected


Decision Curve Analysis: Test: Colon Cancer
Net Benefit
0.0
0.1
0.2
0.3
0.4
0.5
0.0
0.2
0.4
0.6
0.8
Threshold
No Event
Event
loess fit
SEN
1.0
0.8
0.6
0.4
0.2
0.0
Treat All
Treat None


Relative Risk: Test: Colon Cancer
RR
SEN
PPV->
Index(0.88)=0.597
RR(0.32)=1.633
No
Yes
Loess Fit
SPE
1.0
0.8
0.6
0.4
0.2
0.0


ROC: Test: Colon Cancer
(TPR= 0.324 ,TNR= 0.878 ,ACC= 0.596 ,F1= 0.449 ,BER= 0.399)
Sensitivity
Specificity
1.0
0.8
0.6
0.4
0.2
0.0
Confusion Matrix
O(+)
O(−)
T(+)
T(−)
Test
Outcome
AUC: 0.696
BACC (0.601)


Time vs. Events: Test: Colon Cancer
Expected
Observed
Events
0
50
100
150
0
1
2
3
4
5
6
Time



1.3.7 Test Performance

```
pander::pander(t(rrAnalysisTest$keyPoints),caption="Threshold values")
```

Table 29: Threshold values (continued below)

	@:0.596543671607801	@:0.465714066985802	@:0.338856488077808
Thr	0.597	0.466	0.339
RR	1.615	1.812	1.946
SEN	0.324	0.743	0.956
SPE	0.870	0.519	0.122
BACC	0.597	0.631	0.539

	@:0.262529412124052	@:0.5	@MAX_BACC	@MAX_RR	@SPE100	p(0.5)
Thr	0.2854	0.499	0.477	0.334	0.2854	0.499
RR	20.6844	1.669	2.031	3.015	20.6844	1.669
SEN	1.0000	0.434	0.662	0.978	1.0000	0.434
SPE	0.0305	0.809	0.687	0.107	0.0305	0.809
BACC	0.5153	0.621	0.674	0.542	0.5153	0.621

```
pander::pander(t(rrAnalysisTest$OERatio$estimate),caption="O/E Ratio")
```

Table 31: O/E Ratio

O/E	Low	Upper	p.value
0.775	0.65	0.917	0.00222

```
pander::pander(t(rrAnalysisTest$OE95ci),caption="O/E Mean")
```

Table 32: O/E Mean

mean	50%	2.5%	97.5%
0.916	0.916	0.895	0.937

```
pander::pander(t(rrAnalysisTest$OAcum95ci),caption="O/Acum Mean")
```

Table 33: O/Acum Mean

mean	50%	2.5%	97.5%
1.06	1.06	1.06	1.07

```
pander::pander(rrAnalysisTest$c.index$cstatCI,caption="C. Index")
```

mean.C Index	median	lower	upper
0.656	0.656	0.614	0.698

```
pander::pander(t(rrAnalysisTest$ROCAnalysis$aucs),caption="ROC AUC")
```

Table 35: ROC AUC

est	lower	upper
0.696	0.632	0.759

```
pander::pander((rrAnalysisTest$ROCAnalysis$sensitivity),caption="Sensitivity")
```

Table 36: Sensitivity

est	lower	upper
0.324	0.246	0.409

```
pander::pander((rrAnalysisTest$ROCAnalysis$specificity),caption="Specificity")
```

Table 37: Specificity

est	lower	upper
0.878	0.809	0.929

```
pander::pander(t(rrAnalysisTest$thr_atP),caption="Probability Thresholds")
```

Table 38: Probability Thresholds (continued below)

90%	at_max_BACC	at_max_RR	atSPE100	at_0.5	at_max_BACC	at_max_RR
0.597	0.466	0.339	0.263	0.5	0.477	0.334

atSPE100	at_0.5
0.285	0.5

```
pander::pander(t(rrAnalysisTest$RR_atP),caption="Risk Ratio")
```

Table 40: Risk Ratio

est	lower	upper
1.63	1.31	2.03

```
pander::pander(rrAnalysisTest$surdif,caption="Logrank test")
```

Table 41: Logrank test Chisq = 36.562917 on 2 degrees of freedom, p = 0.000000

	N	Observed	Expected	(O-E)^2/E	(O-E)^2/V
class=0	103	35	62.1	11.830	21.942
class=1	104	57	52.5	0.389	0.634
class=2	60	44	21.4	23.831	28.634

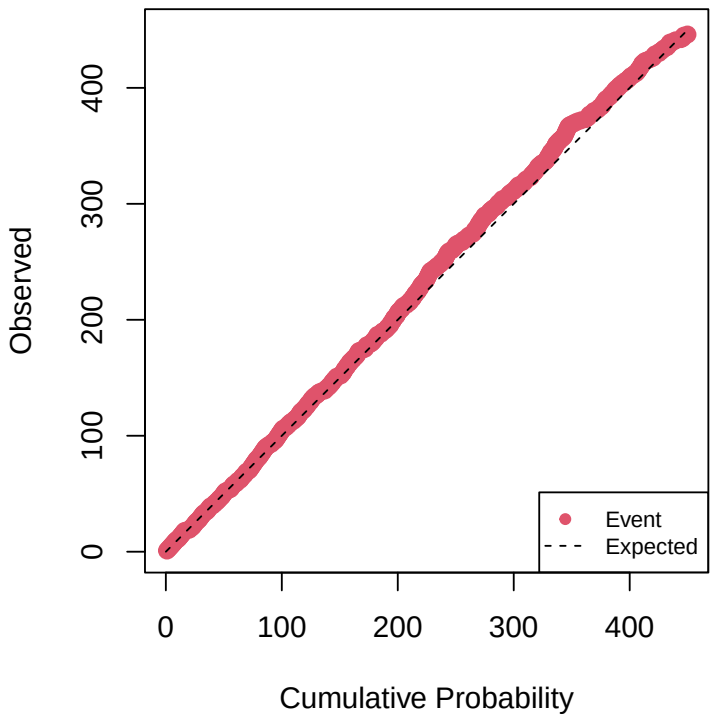
1.4 Cross-Validation

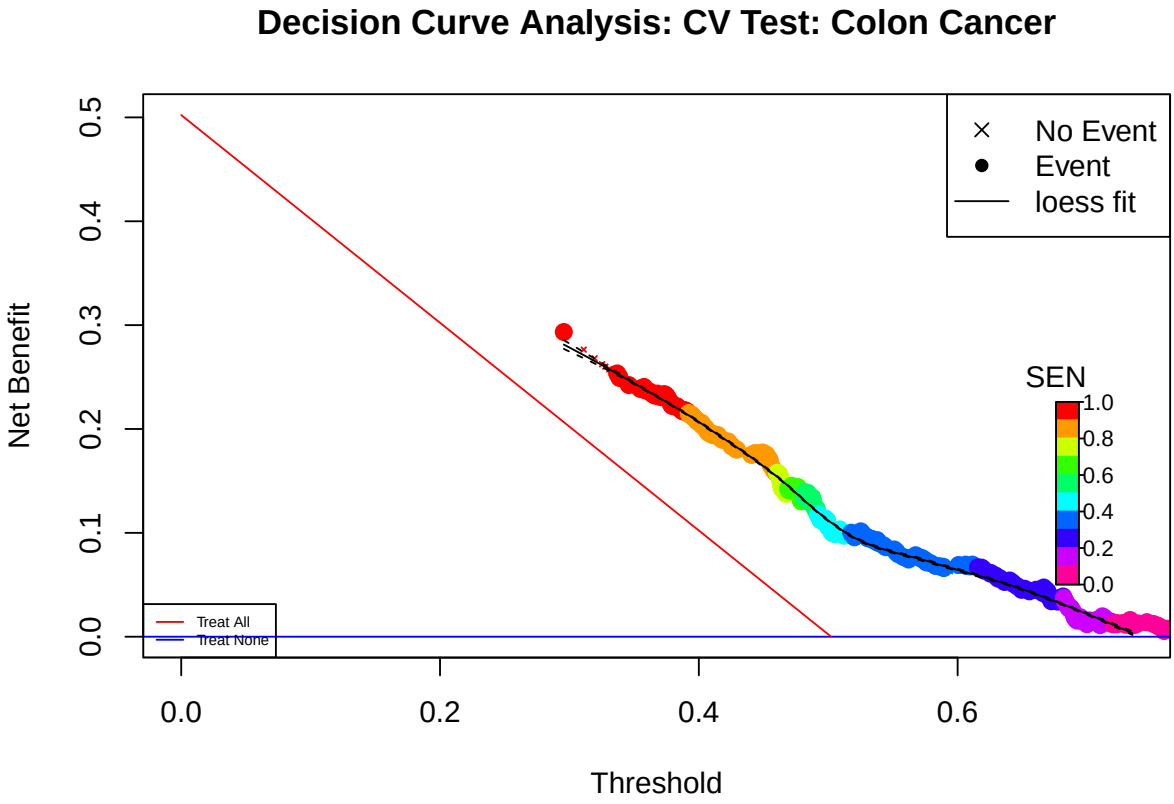
Here we will cross validate the training set and evaluate also on the testing set. The h0 and the timeinterval are the ones estimated on the calibration process

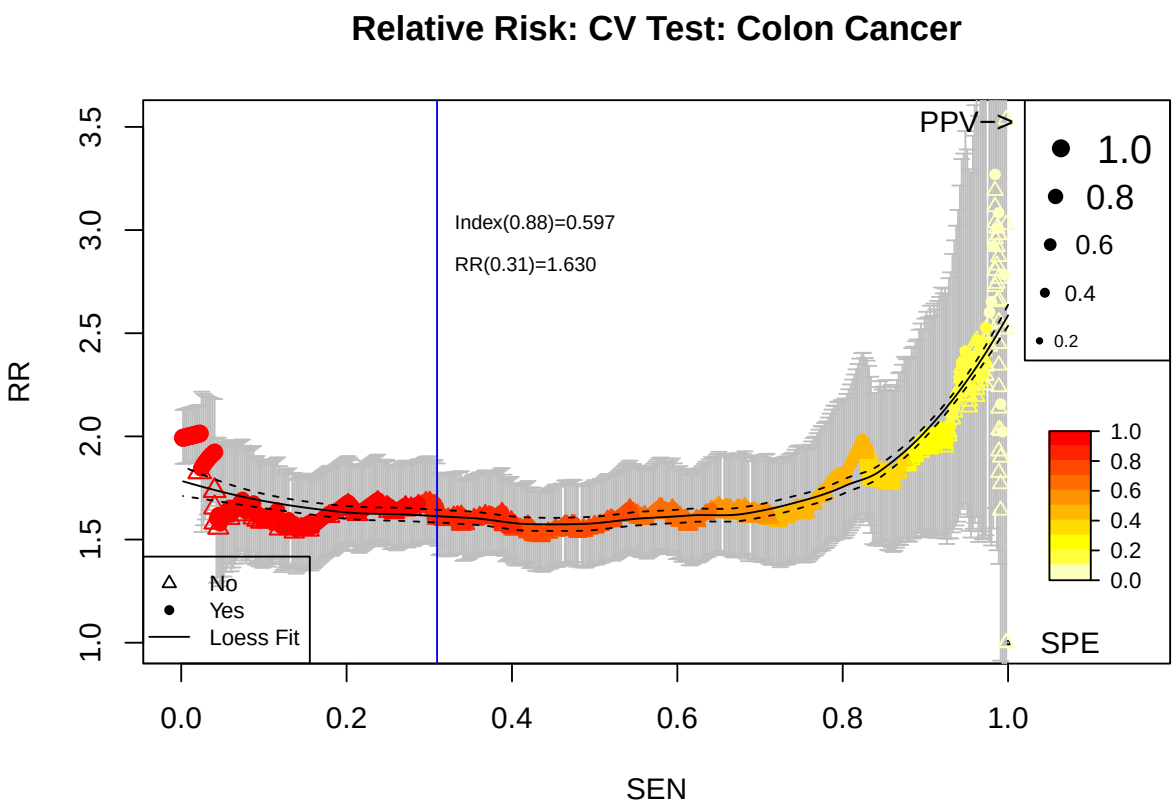
```
rcv <- randomCV(theData=dataColonTrain,
                theOutcome = Surv(time,status)~1,
                fittingFunction=BSWiMS.model,
                trainFraction = 0.75,
                repetitions=50,
                classSamplingType = "Pro",
                testingSet=dataColonTest
        )
```

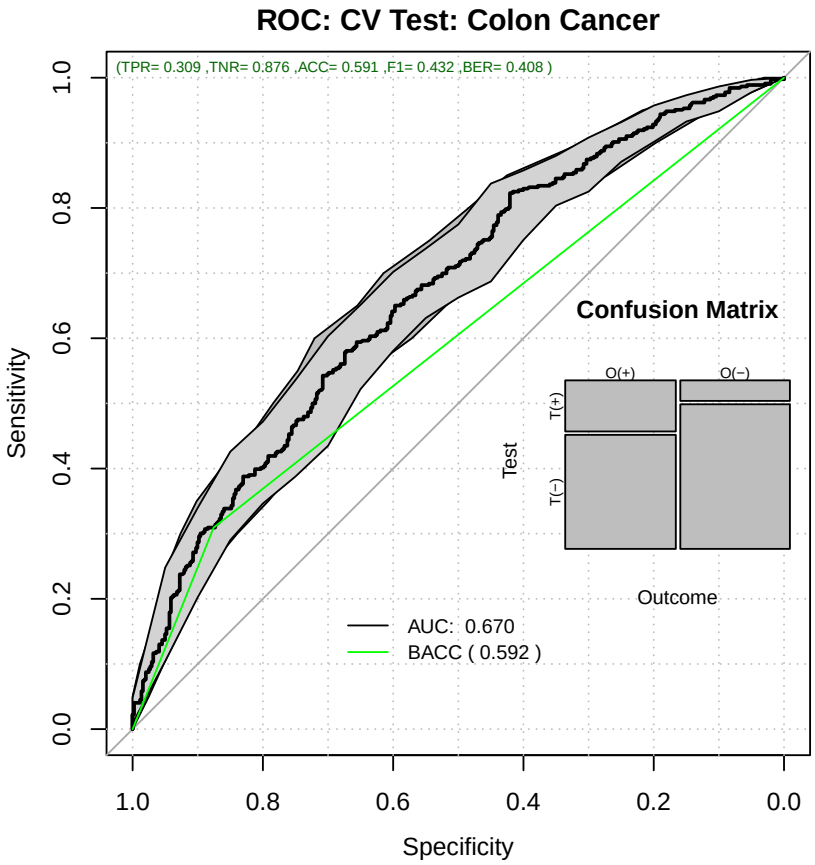
.[+++-].[+++-].[+++].[++++++].[++++].[++++–].[+++-].[++++-].[++++].[++]10 Tested: 849 Avg. Selected: 7.8 Min Tests: 1 Max Tests: 10 Mean Tests: 4.982332 . MAD: 0.4754711 .[++++-].[+++].[++++-].[++++].[+++].[+++].[+++-].[+++-].[+++].[+++]20 Tested: 885 Avg. Selected: 7.75 Min Tests: 1 Max Tests: 20 Mean Tests: 9.559322 . MAD: 0.4737964 .[+++-].[+++++].[++++].[++++].[++].[+++].[+++++].[+++].[++++].[++++]30 Tested: 888 Avg. Selected: 7.766667 Min Tests: 1 Max Tests: 30 Mean Tests: 14.29054 . MAD: 0.4741673 .[++++].[++++].[+++-].[++++-].[+++].[+++].[++++-].[++++–].[++++-].[++]40 Tested: 888 Avg. Selected: 7.65 Min Tests: 2 Max Tests: 40 Mean Tests: 19.05405 . MAD: 0.4743209 .[++++].[++++–].[++++-].[++++–].[++++-].[++++-].[++++].[+++++].[++-].[++++]50 Tested: 888 Avg. Selected: 7.58 Min Tests: 3 Max Tests: 50 Mean Tests: 23.81757 . MAD: 0.474706

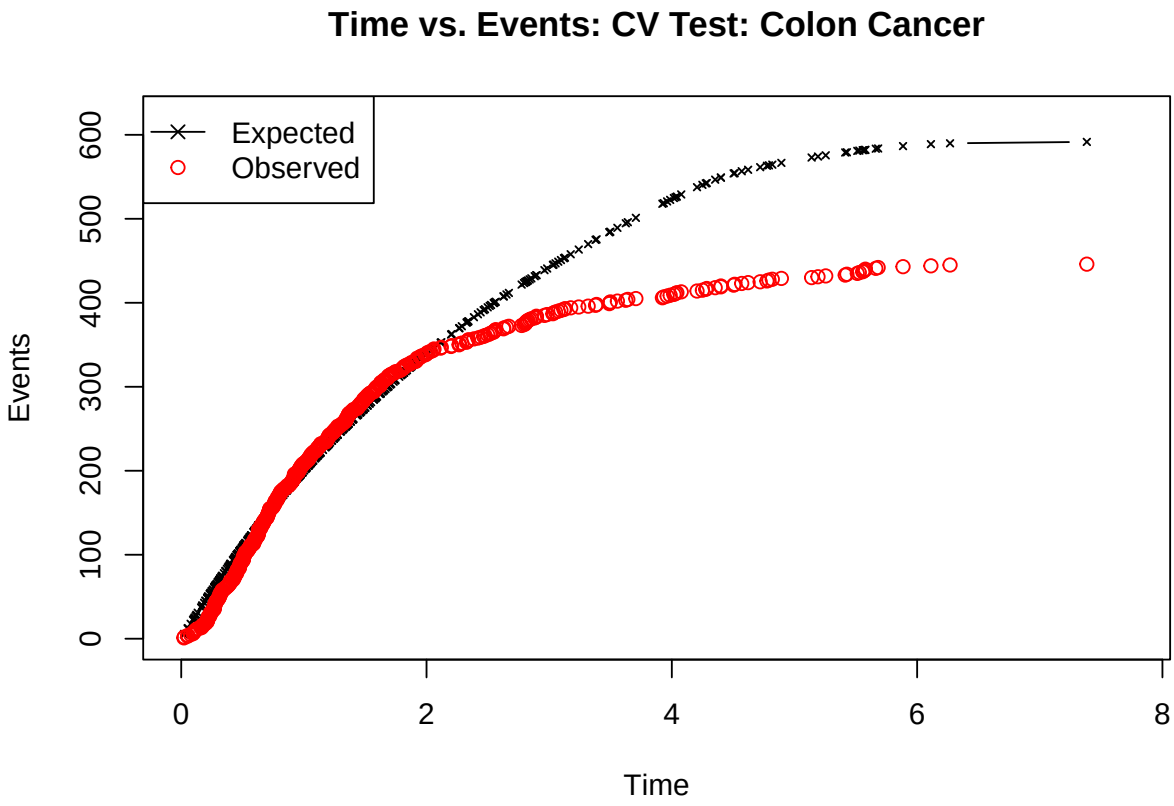
```
stp <- rcv$survTestPredictions
stp <- stp[!is.na(stp[,4]),]

bbx <- boxplot(unlist(stp[,1])~rownames(stp),plot=FALSE)
times <- bbx$stats[3,]
status <- boxplot(unlist(stp[,2])~rownames(stp),plot=FALSE)$stats[3,]
prob <- ppoisGzero(boxplot(unlist(stp[,4])~rownames(stp),plot=FALSE)$stats[3,],h0)

rdatacv <- cbind(status,prob)
rownames(rdatacv) <- bbx$names
names(times) <- bbx$names

rrAnalysisCVTest <- RRPlot(rdatacv,atThr = rrAnalysisTrain$thr_atP,
                     timetoEvent=times,
                     title="CV Test: Colon Cancer",
                     ysurvlim=c(0.00,1.0),
                     riskTimeInterval=timeinterval)
```

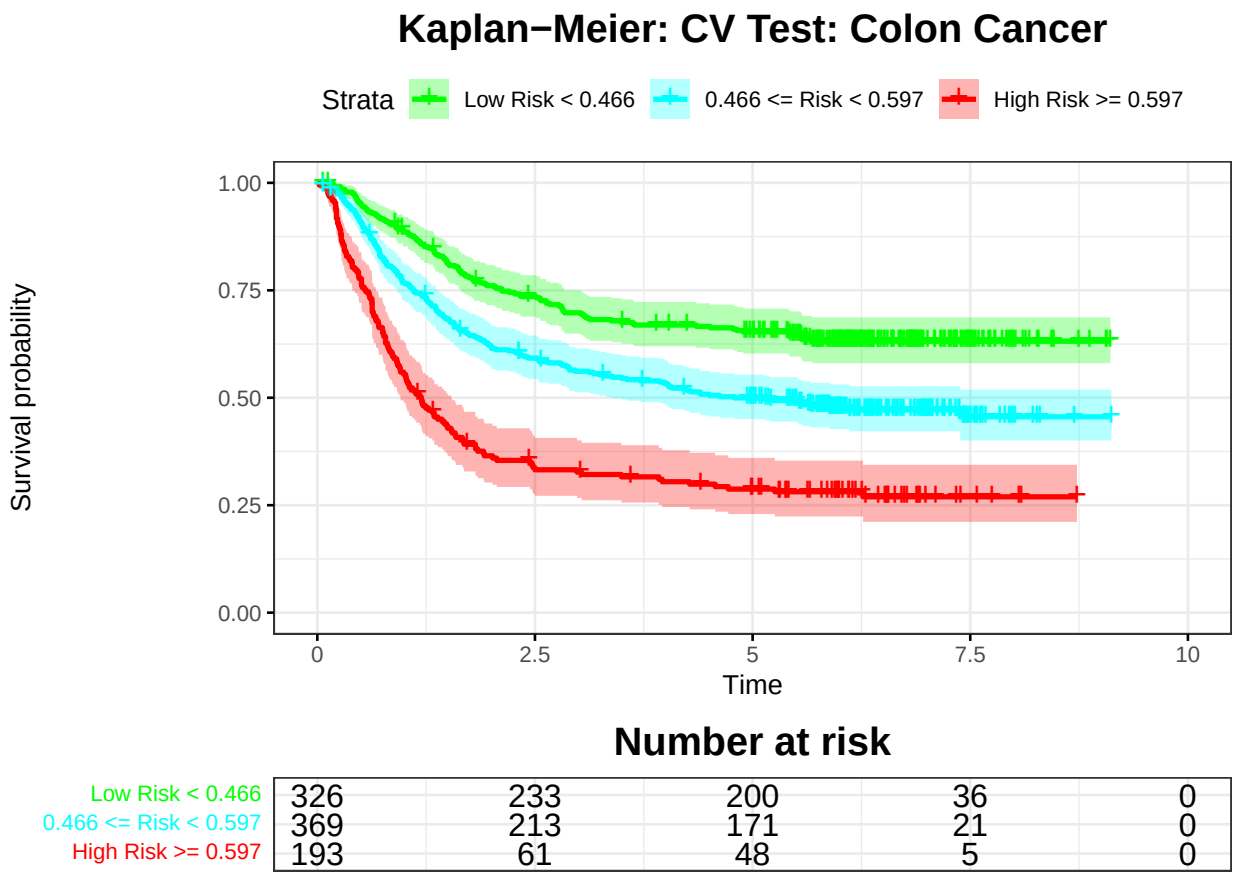

Cumulative vs. Observed: CV Test: Colon Cancer
Observed
0
100
200
300
400
Cumulative Probability
0
100
200
300
400
Event
Expected


Decision Curve Analysis: CV Test: Colon Cancer
No Event
Event
loess fit
SEN
1.0
0.8
0.6
0.4
0.2
0.0
Treat All
Treat None
Net Benefit
0.0
0.1
0.2
0.3
0.4
0.5
0.0
0.2
0.4
0.6
Threshold


Relative Risk: CV Test: Colon Cancer
RR
SEN
PPV–>
SPE
Index(0.88)=0.597
RR(0.31)=1.630
No
Yes
Loess Fit
1.0
0.8
0.6
0.4
0.2
0.0
1.0
1.5
2.0
2.5
3.0
3.5
0.0
0.2
0.4
0.6
0.8
1.0


ROC: CV Test: Colon Cancer
(TPR= 0.309 ,TNR= 0.876 ,ACC= 0.591 ,F1= 0.432 ,BER= 0.408)
Sensitivity
Specificity
1.0
0.8
0.6
0.4
0.2
0.0
Confusion Matrix
O(+)
O(−)
T(+)
T(−)
Test
Outcome
AUC: 0.670
BACC (0.592)


Time vs. Events: CV Test: Colon Cancer
Expected
Observed
Events
0
100
200
300
400
500
600
0
2
4
6
8
Time



1.4.1 CV Test Performance

```
pander::pander(t(rrAnalysisCVTest$keyPoints),caption="Threshold values")
```

Table 42: Threshold values (continued below)

	@:0.596543671607801	@:0.465714066985802	@:0.338856488077808
Thr	0.597	0.466	0.3387
RR	1.613	1.623	2.0228
SEN	0.309	0.738	0.9933
SPE	0.876	0.471	0.0204
BACC	0.592	0.604	0.5068

	@:0.262529412124052	@:0.5	@MAX_BACC	@MAX_RR	@SPE100	p(0.5)
Thr	0.296	0.500	0.484	0.362	0.296	0.500
RR	1.000	1.553	1.659	2.527	1.000	1.553
SEN	1.000	0.451	0.578	0.973	1.000	0.451
SPE	0.000	0.760	0.674	0.104	0.000	0.760
BACC	0.500	0.605	0.626	0.539	0.500	0.605

```
pander::pander(t(rrAnalysisCVTest$OERatio$estimate),caption="O/E Ratio")
```

Table 44: O/E Ratio

O/E	Low	Upper	p.value
0.754	0.686	0.827	4.53e-10

```
pander::pander(t(rrAnalysisCVTest$OE95ci),caption="O/E Mean")
```

Table 45: O/E Mean

mean	50%	2.5%	97.5%
0.937	0.937	0.926	0.948

```
pander::pander(t(rrAnalysisCVTest$OAcum95ci),caption="O/Acum Mean")
```

Table 46: O/Acum Mean

mean	50%	2.5%	97.5%
1.03	1.03	1.03	1.03

```
pander::pander(rrAnalysisCVTest$c.index$cstatCI,caption="C. Index")
```

mean.C Index	median	lower	upper
0.644	0.644	0.618	0.669

```
pander::pander(t(rrAnalysisCVTest$ROCAnalysis$aucs),caption="ROC AUC")
```

Table 48: ROC AUC

est	lower	upper
0.67	0.634	0.705

```
pander::pander((rrAnalysisCVTest$ROCAnalysis$sensitivity),caption="Sensitivity")
```

Table 49: Sensitivity

est	lower	upper
0.309	0.267	0.355

```
pander::pander((rrAnalysisCVTest$ROCAnalysis$specificity),caption="Specificity")
```

Table 50: Specificity

est	lower	upper
0.876	0.841	0.905

```
pander::pander(t(rrAnalysisCVTest$thr_atP),caption="Probability Thresholds")
```

Table 51: Probability Thresholds (continued below)

90%	at_max_BACC	at_max_RR	atSPE100	at_0.5	at_max_BACC	at_max_RR
0.597	0.466	0.339	0.263	0.5	0.484	0.362

atSPE100	at_0.5
0.296	0.5

```
pander::pander(t(rrAnalysisCVTest$RR_atP),caption="Risk Ratio")
```

Table 53: Risk Ratio

est	lower	upper
1.63	1.44	1.84

```
pander::pander(rrAnalysisCVTest$surdif,caption="Logrank test")
```

Table 54: Logrank test Chisq = 94.306437 on 2 degrees of freedom, p = 0.000000

	N	Observed	Expected	(O-E)^2/E	(O-E)^2/V
class=0	326	117	189.2	27.5255	48.037
class=1	369	191	186.8	0.0963	0.166
class=2	193	138	70.1	65.8142	78.707