```
1 import pandas as pd
2 import io
3 import matplotlib
4 import scipy
5 from scipy import stats as stats
6 import seaborn as sns
7 import matplotlib.pyplot as plt
8 import math
9 import numpy as np
```

```
1 data = pd.read_csv('all_predictions.csv')
2 data
3
```

	Unnamed: 0.2	Unnamed: 0.1	Unnamed: 0	HR	O2Sat	SBP	MAP	Age	HospAdmTime	IC
0	0	365227	365227.0	78.0	98.0	94.0	68.00	24.11	-0.02	
1	1	206374	206374.0	70.0	97.5	126.5	87.50	61.08	-6.42	
2	2	308975	308975.0	95.0	100.0	135.0	81.00	67.96	-65.21	
3	3	374832	374832.0	119.0	98.0	97.0	61.67	71.60	-179.78	
4	4	347184	347184.0	66.0	97.0	116.0	78.00	25.94	-0.03	
...	...	...	...	...	...	...	...	...	...	
9995	9995	82849	82849.0	77.0	100.0	153.0	109.00	50.00	-0.02	
9996	9996	363630	363630.0	66.0	98.0	115.0	79.00	59.00	-14.19	
9997	9997	10942	10942.0	70.0	95.0	121.0	98.00	58.00	-2.88	
9998	9998	100550	100550.0	99.0	95.0	94.0	65.00	78.00	-1.89	
9999	9999	109244	109244.0	107.5	95.0	108.5	86.50	87.20	-102.37	

FIRST MODEL - RANDOM FOREST

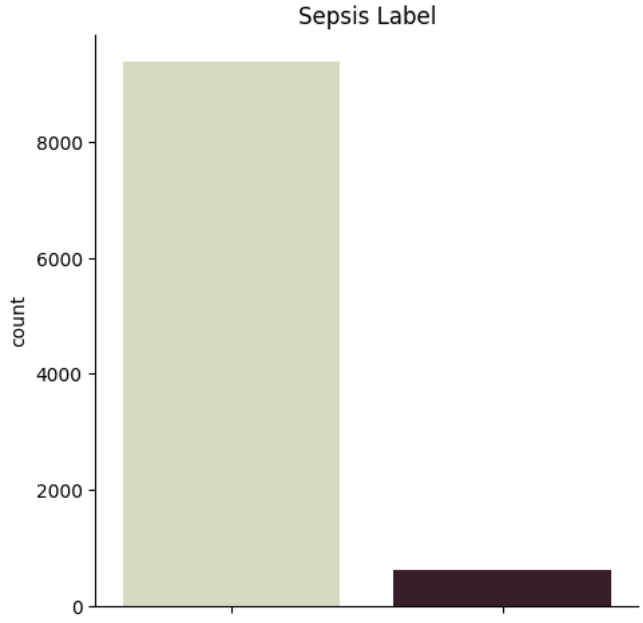
> Indented block

```
1 len(data[data['RForest']==1])/len(data)
```

```
0.0616
```

```
1 sns.catplot(x="RForest", kind="count", palette="ch:.50", data=data).set(title='Sepsis Label')
```

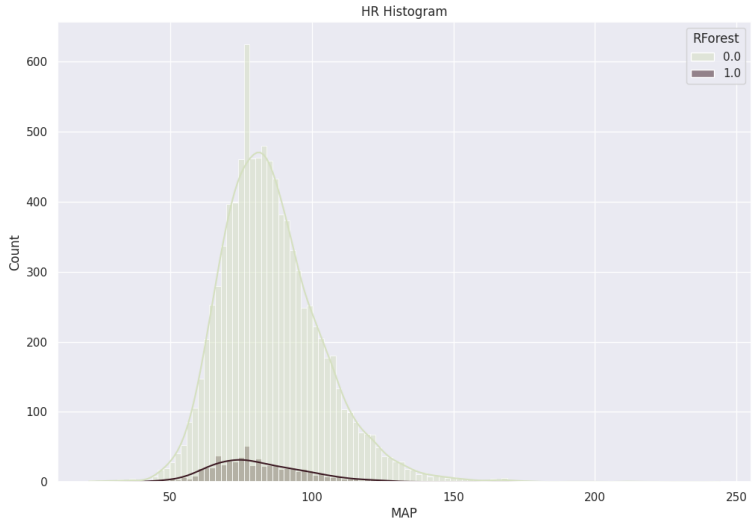
```
<seaborn.axisgrid.FacetGrid at 0x7f11795d67a0>
```



```
sns.histplot(data=data, x="MAP" ,kde=True, hue="RForest",  palette="ch:.60").set_title('HR Histogram')

```

```
Text(0.5, 1.0, 'HR Histogram')
```



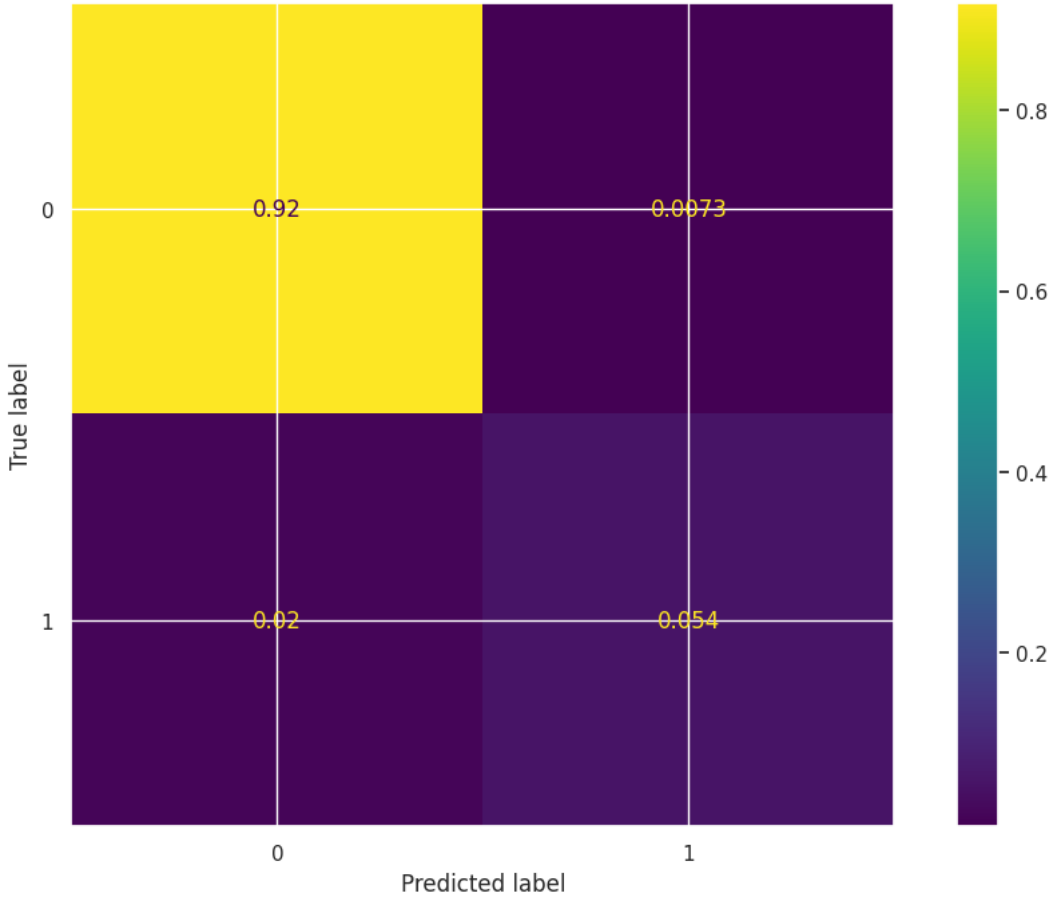

```
from sklearn.metrics import confusion_matrix, ConfusionMatrixDisplay

young = data[data['Age']<50]
older = data[data['Age']>=50]
cm = confusion_matrix(young['SepsisLabel'], young['RForest'], normalize='all')
cmd = ConfusionMatrixDisplay(cm)
cmd.plot()
```

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at
0x7f1169ba3520>
```

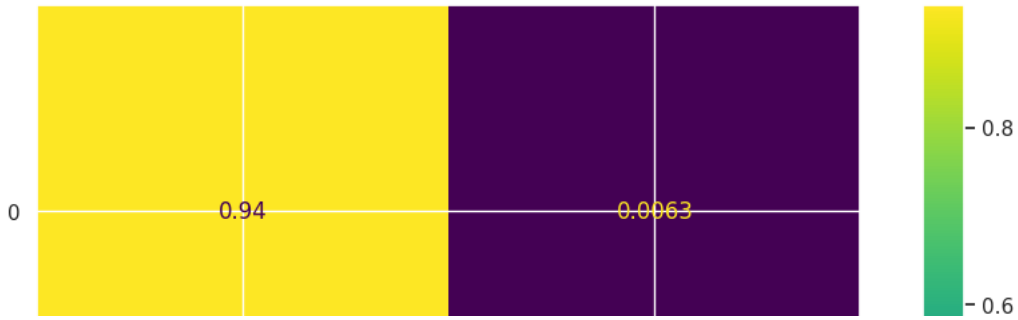

```
1 cm = confusion_matrix(older['SepsisLabel'], older['RForest'], normalize='all')
2 cmd = ConfusionMatrixDisplay(cm)
3 cmd.plot()
```

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7f116968c130>
```



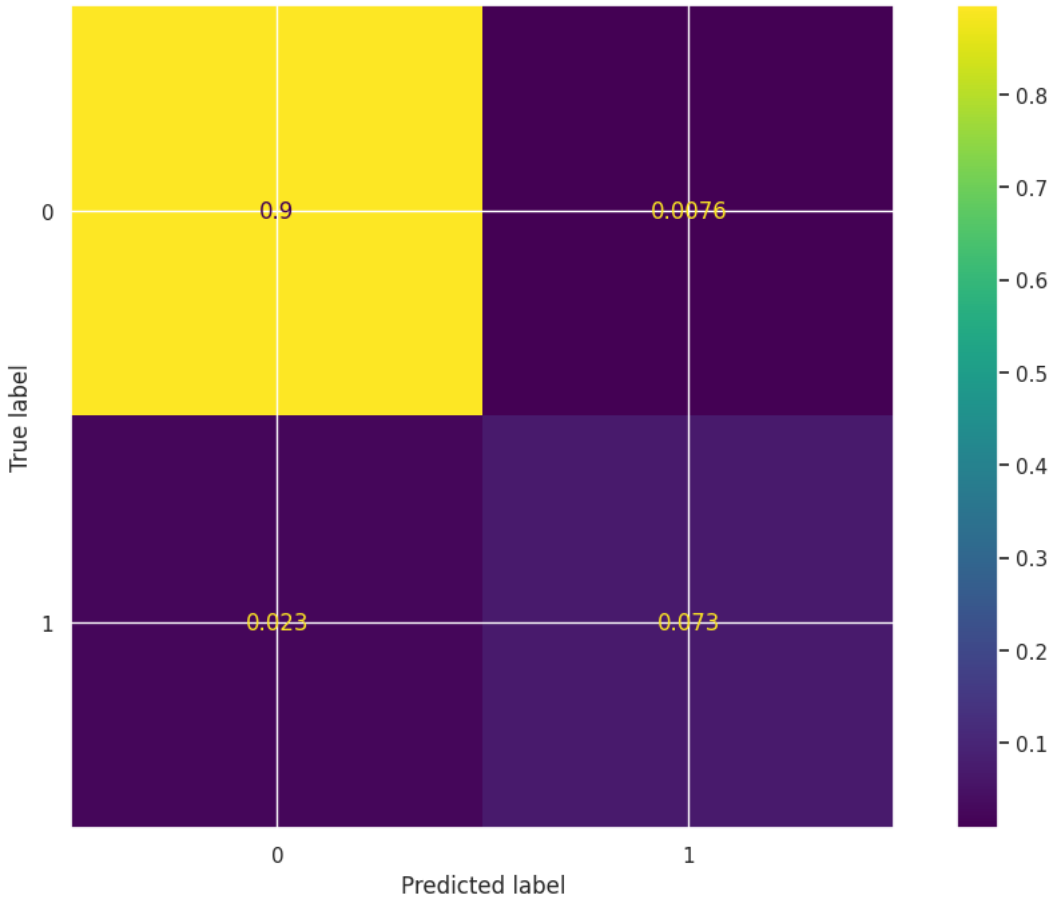

```
1 low_HR = data[data['HR']<np.mean(data['HR'])]
2 high_HR = data[data['HR']>=np.mean(data['HR'])]
3 cm = confusion_matrix(low_HR['SepsisLabel'], low_HR['RForest'], normalize='all')
4 cmd = ConfusionMatrixDisplay(cm)
5 cmd.plot()
```

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7f1169851a20>
```




```
1 cm = confusion_matrix(high_HR['SepsisLabel'], high_HR['RForest'], normalize='all')
2 cmd = ConfusionMatrixDisplay(cm)
3 cmd.plot()
```

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7f116d78fe50>
```




```
1 from sklearn.metrics import classification_report
2 print(classification_report(data['SepsisLabel'], data['RForest'], target_names=['0','1']))
```

```
              precision    recall  f1-score   support

           0       0.98      0.99      0.99      9259
           1       0.89      0.74      0.81       741

    accuracy                           0.97     10000
   macro avg       0.93      0.87      0.90     10000
weighted avg       0.97      0.97      0.97     10000
```

SECOND MODEL - GB

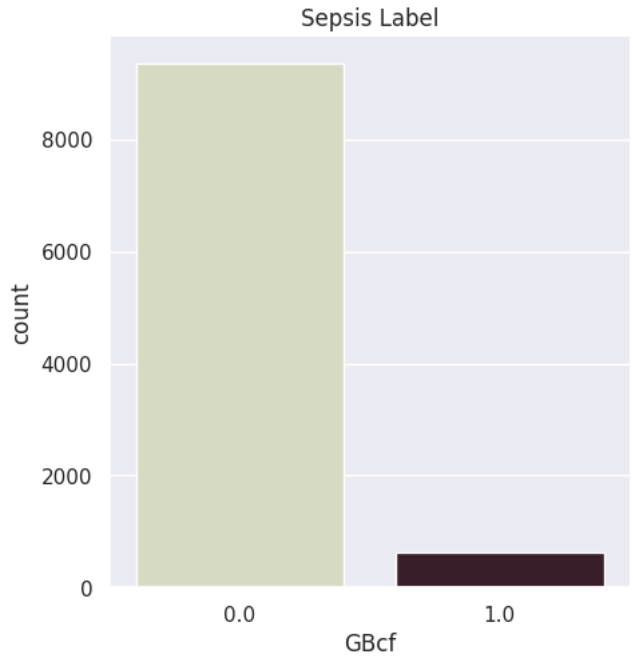
> Indented block

```
1
2 len(data[data['GBcf']==1])/len(data)
```

```
0.0631
```

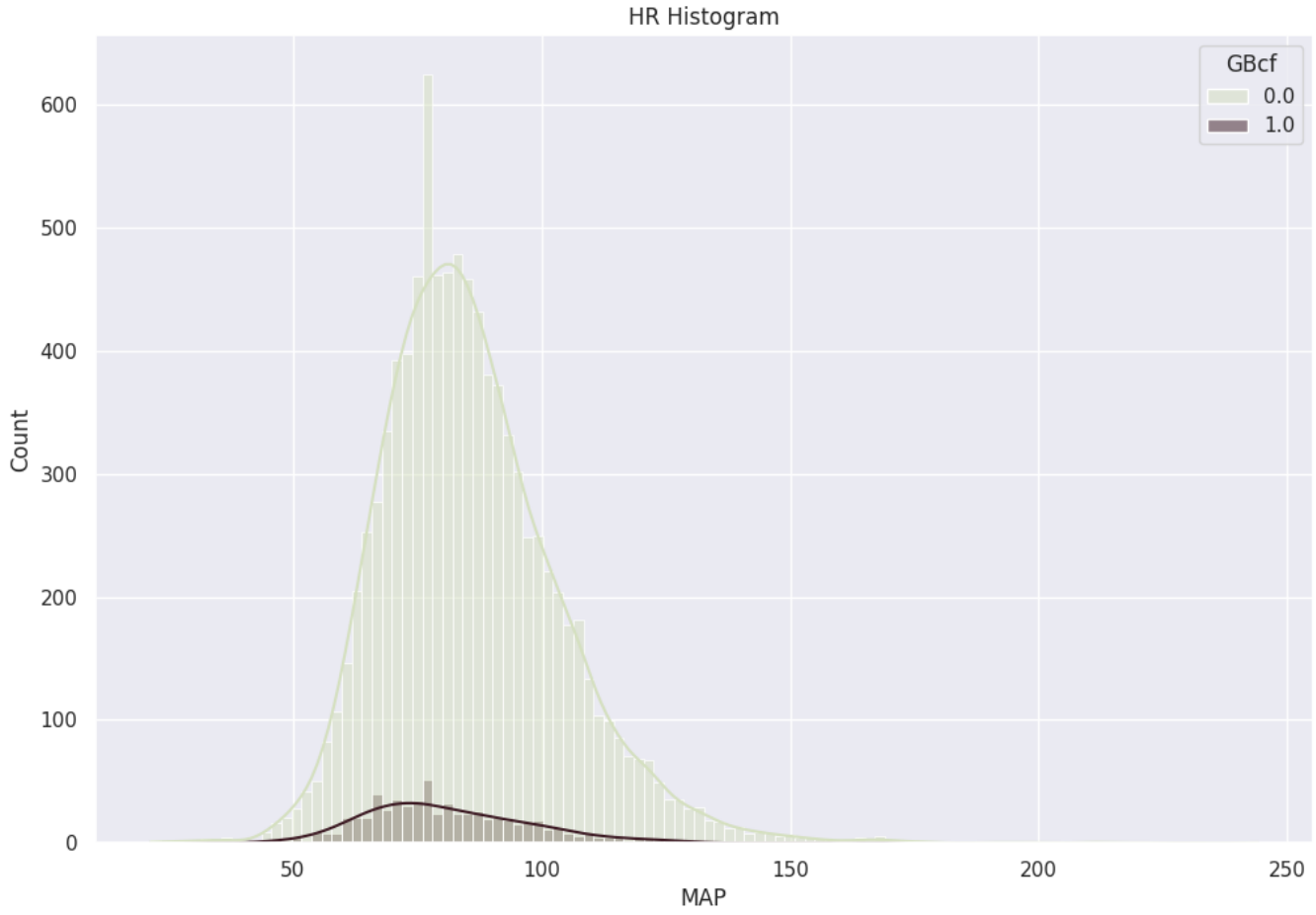
```
1 sns.catplot(x="GBcf", kind="count", palette="ch:.50", data=data).set(title='Sepsis Label')
```

```
<seaborn.axisgrid.FacetGrid at 0x7f116d0776a0>
```




```
1 sns.histplot(data=data, x="MAP" ,kde=True, hue="GBcf",  palette="ch:.60").set_title('HR Histogram')
2
```

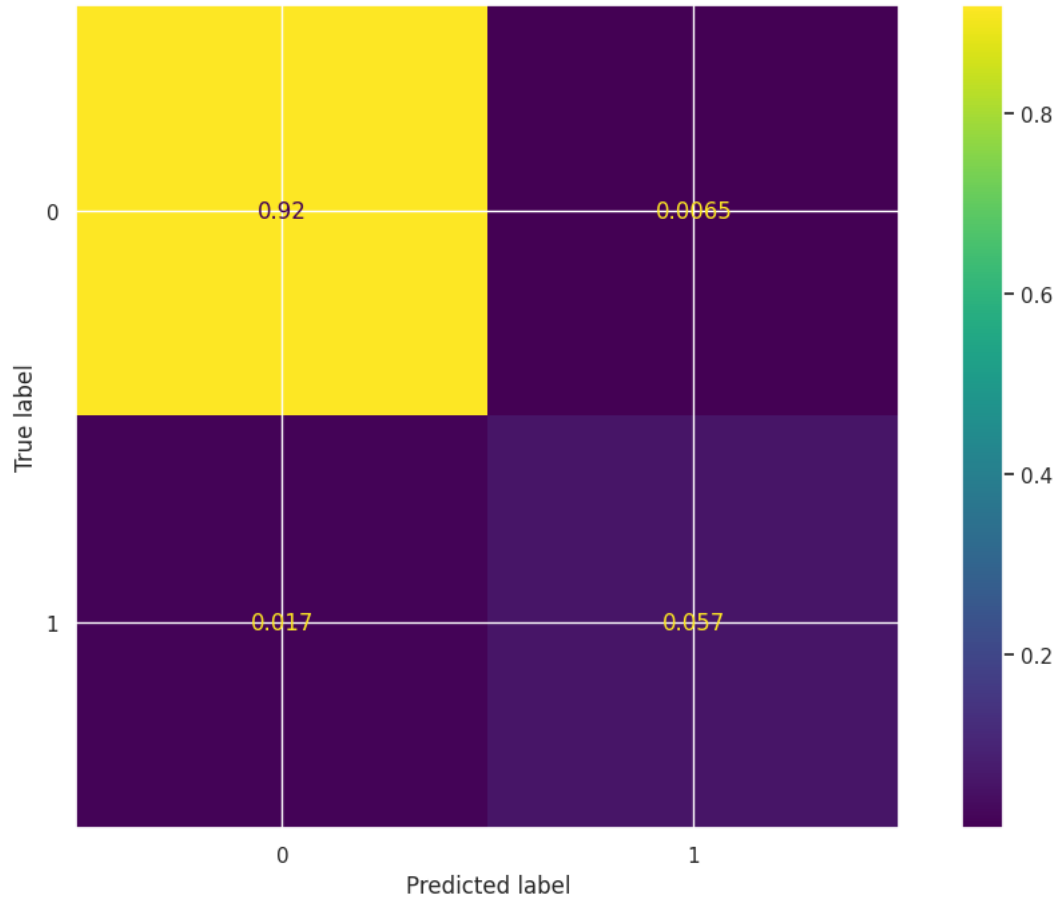
```
Text(0.5, 1.0, 'HR Histogram')
```



```
from sklearn.metrics import confusion_matrix, ConfusionMatrixDisplay

young = data[data['Age']<50]
older = data[data['Age']>=50]
cm = confusion_matrix(young['SepsisLabel'], young['GBcf'], normalize='all')
cmd = ConfusionMatrixDisplay(cm)
cmd.plot()
```

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7f1168a4bd00>
```

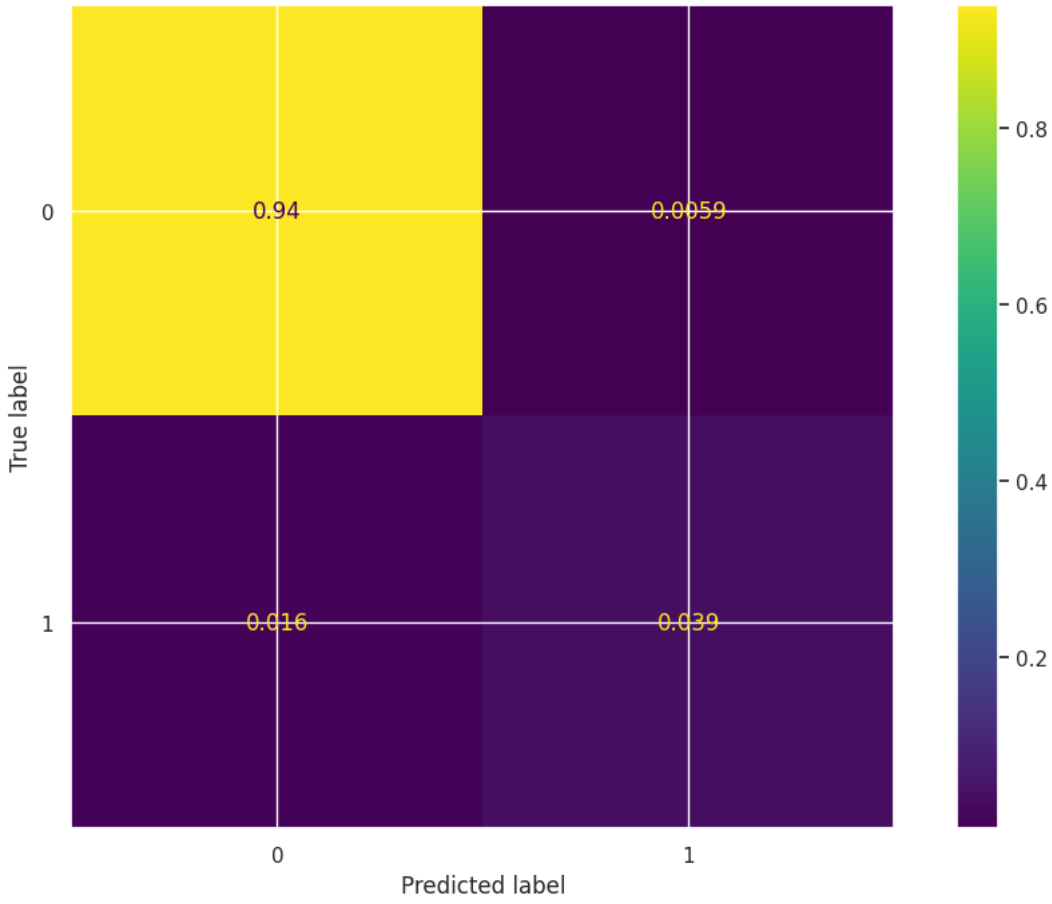



```
cm = confusion_matrix(older['SepsisLabel'], older['GBcf'], normalize='all')
cmd = ConfusionMatrixDisplay(cm)
cmd.plot()
```

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7f1168be3a30>
```

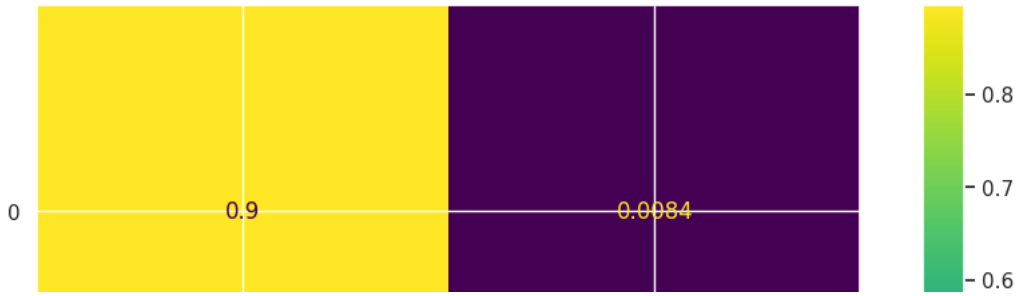

```
low_HR = data[data['HR']<np.mean(data['HR'])]
high_HR = data[data['HR']>=np.mean(data['HR'])]
cm = confusion_matrix(low_HR['SepsisLabel'], low_HR['GBcf'], normalize='all')
cmd = ConfusionMatrixDisplay(cm)
cmd.plot()
```

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7f116887fdf0>
```




```
cm = confusion_matrix(high_HR['SepsisLabel'], high_HR['GBcf'], normalize='all')
cmd = ConfusionMatrixDisplay(cm)
cmd.plot()
```

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7f1168837610>
```




```
1 from sklearn.metrics import classification_report
2 print(classification_report(data['SepsisLabel'], data['GBcf'], target_names=['0','1']))
```

```
              precision    recall  f1-score   support

           0       0.98      0.99      0.99      9259
           1       0.89      0.76      0.82       741

    accuracy                           0.97     10000
   macro avg       0.93      0.87      0.90     10000
weighted avg       0.97      0.97      0.97     10000
```


```
1
```

THIRD MODEL - LOGISTIC REGRESSION

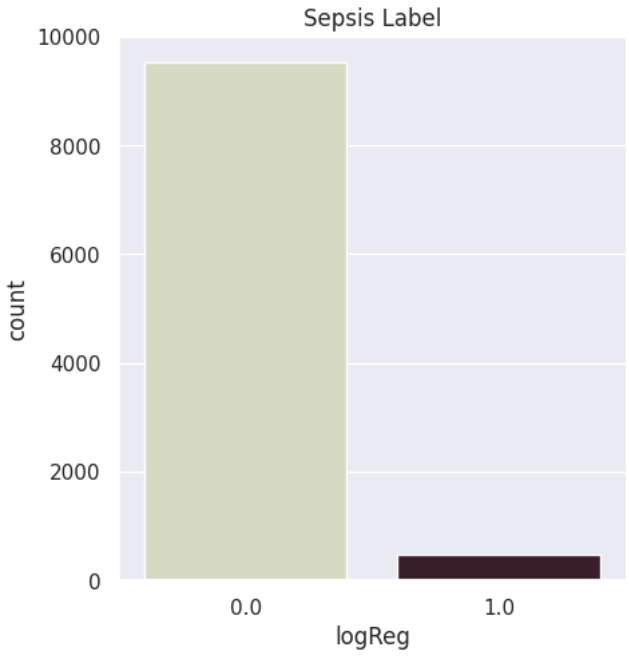
Indented block

```
                    0                    1
1 len(data[data['logReg']==1])/len(data)
```

```
0.0476
```

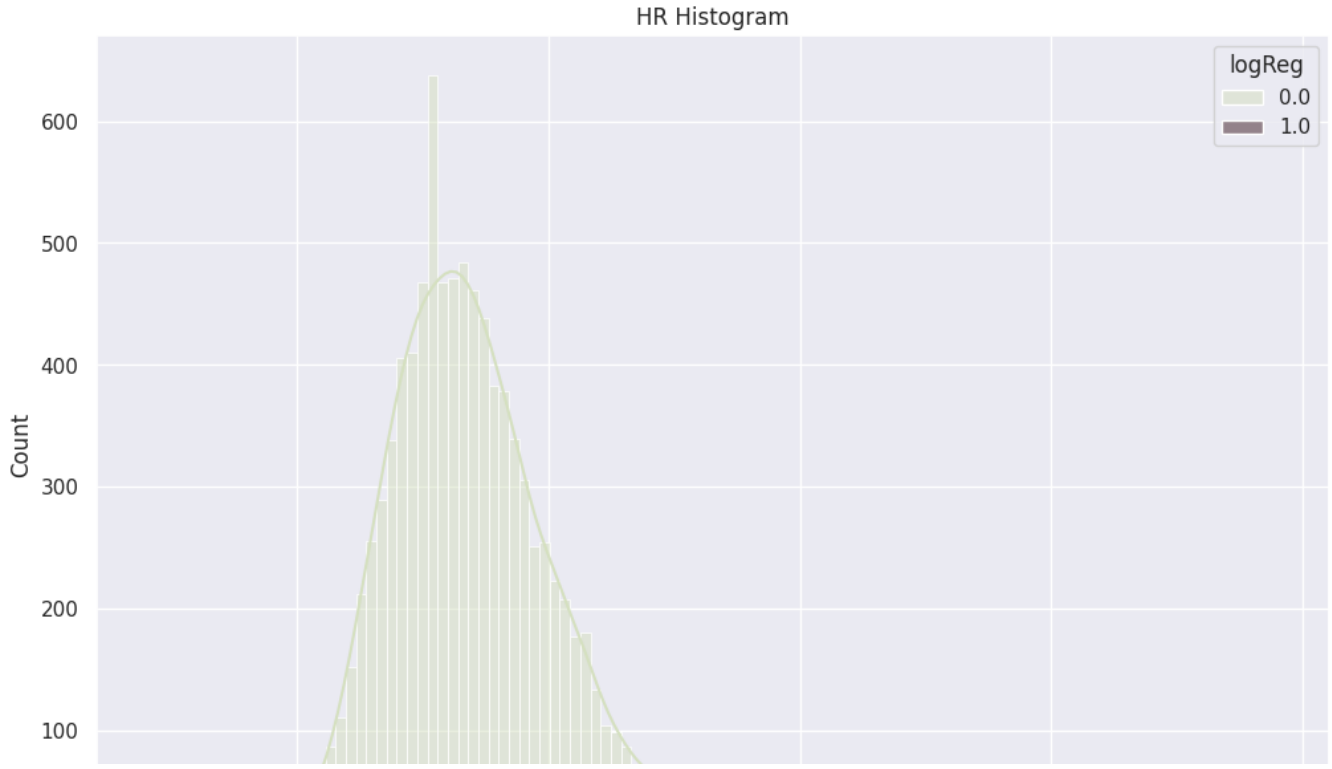
```
1 sns.catplot(x="logReg", kind="count", palette="ch:.50", data=data).set(title='Sepsis Label')
```

```
<seaborn.axisgrid.FacetGrid at 0x7f1168835db0>
```




```
1 sns.histplot(data=data, x="MAP" ,kde=True, hue="logReg",  palette="ch:.60").set_title('HR Histogram')
2
```

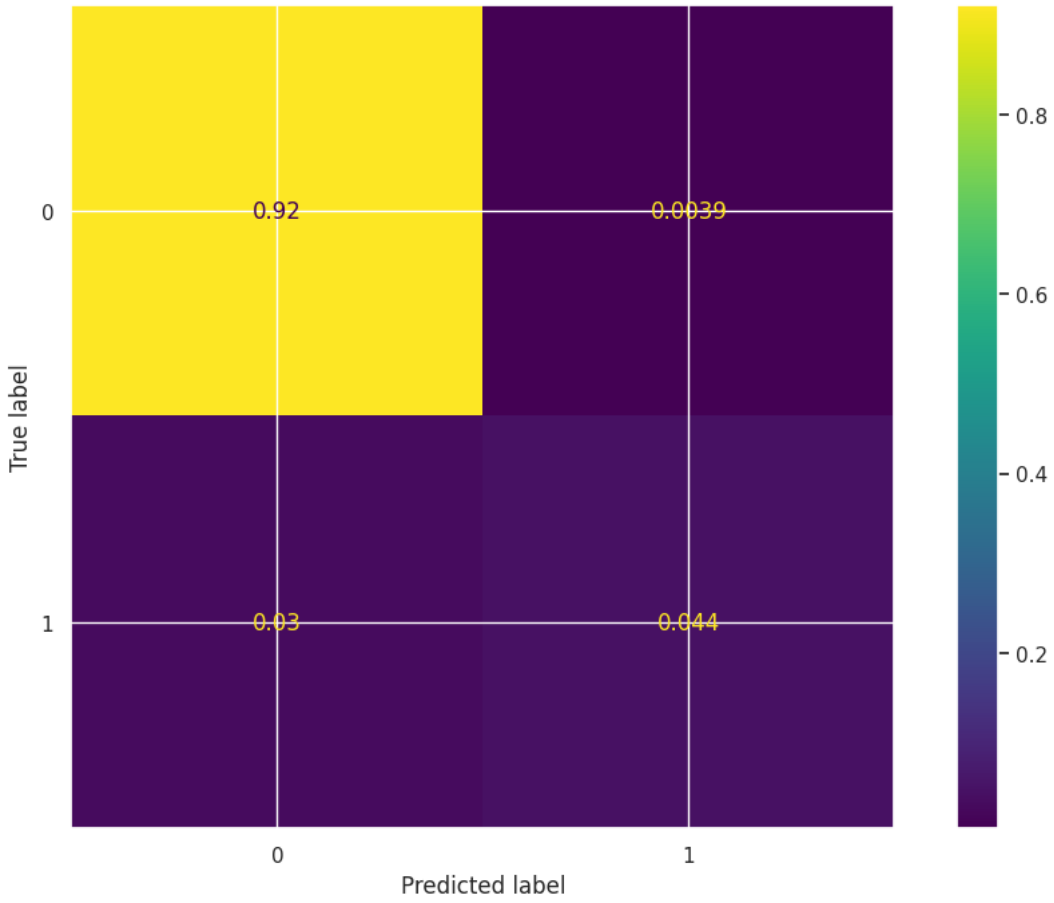
```
Text(0.5, 1.0, 'HR Histogram')
```




```
from sklearn.metrics import confusion_matrix, ConfusionMatrixDisplay

young = data[data['Age']<50]
older = data[data['Age']>=50]
cm = confusion_matrix(young['SepsisLabel'], young['logReg'], normalize='all')
cmd = ConfusionMatrixDisplay(cm)
cmd.plot()
```

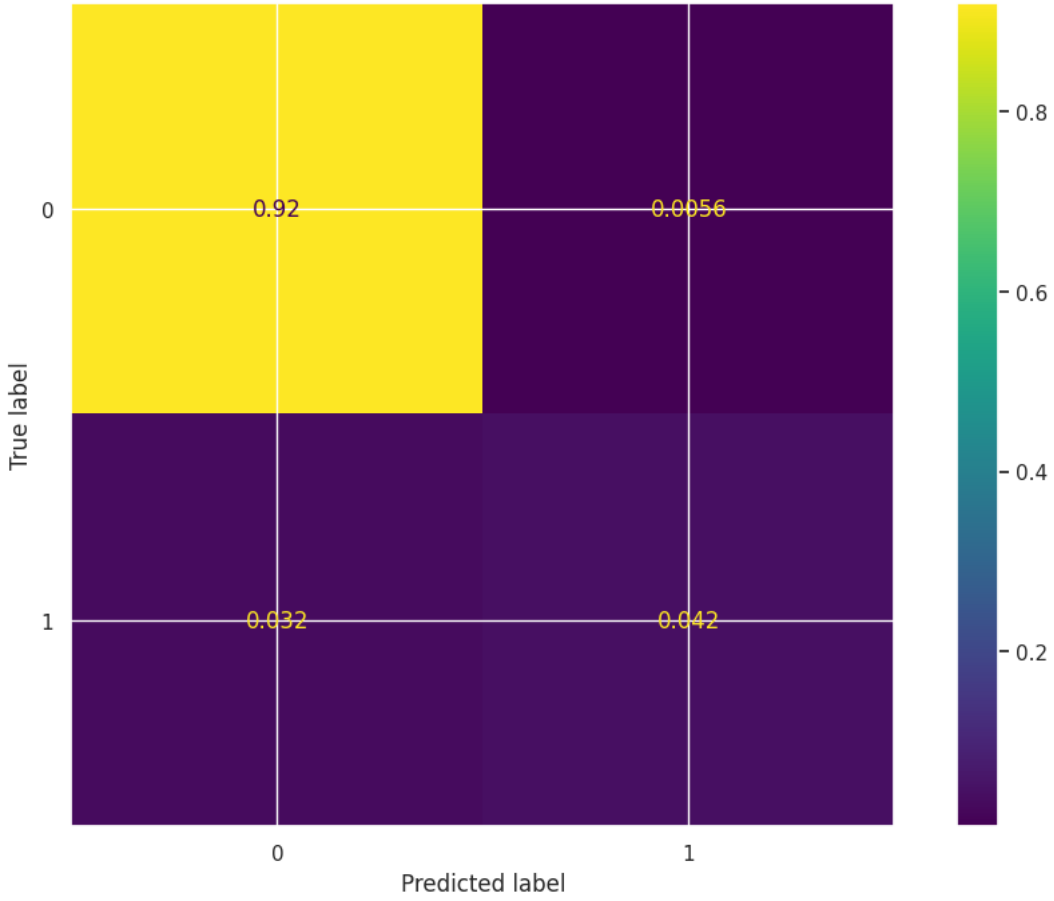
```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7f116870ad10>
```




```
cm = confusion_matrix(older['SepsisLabel'], older['logReg'], normalize='all')
cmd = ConfusionMatrixDisplay(cm)
```

```
3 cmd.plot()
```

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7f11682f29e0>
```

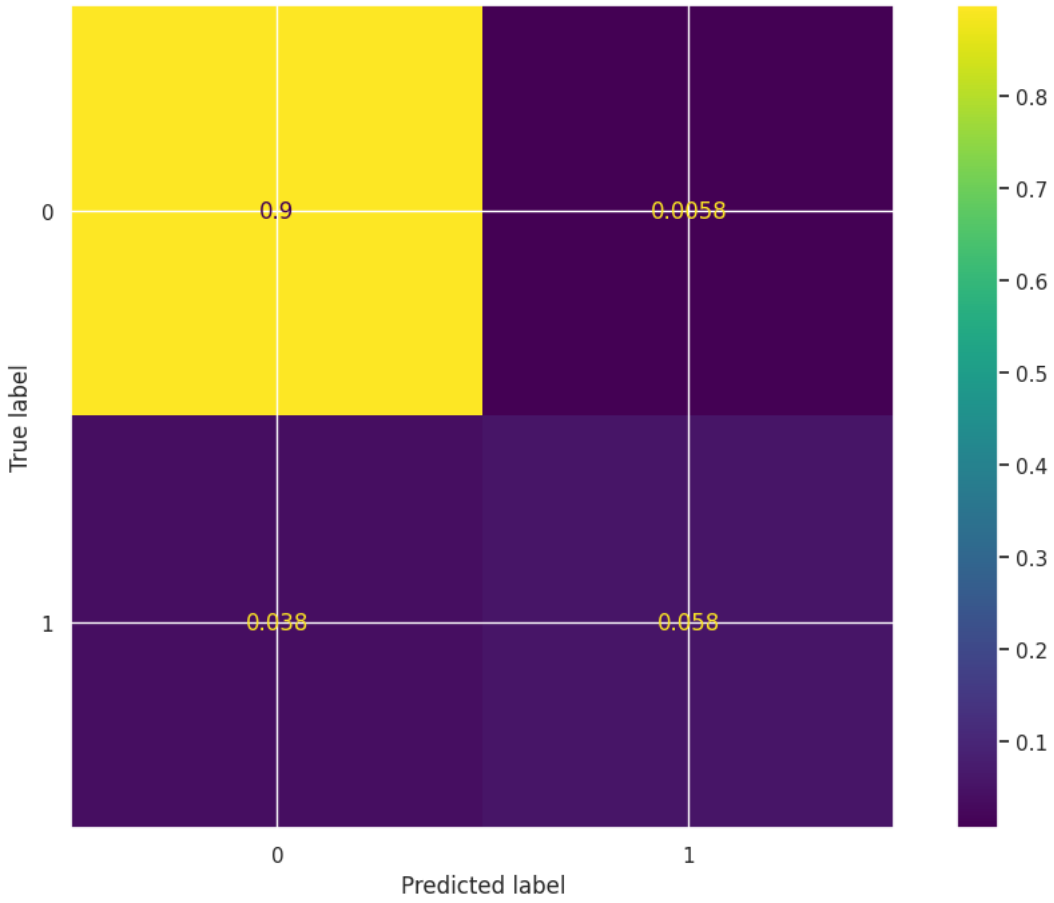



```
1 low_HR = data[data['HR']<np.mean(data['HR'])]
2 high_HR = data[data['HR']>=np.mean(data['HR'])]
3 cm = confusion_matrix(low_HR['SepsisLabel'], low_HR['logReg'], normalize='all')
4 cmd = ConfusionMatrixDisplay(cm)
5 cmd.plot()
```

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7f1168353a90>
```

```
1 cm = confusion_matrix(high_HR['SepsisLabel'], high_HR['logReg'], normalize='all')
2 cmd = ConfusionMatrixDisplay(cm)
3 cmd.plot()
```

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7f1168186c80>
```




```
1 from sklearn.metrics import classification_report
2 print(classification_report(data['SepsisLabel'], data['logReg'], target_names=['0','1']))
```

```
              precision    recall  f1-score   support

           0       0.97      0.99      0.98      9259
           1       0.89      0.57      0.70       741

    accuracy                           0.96     10000
   macro avg       0.93      0.78      0.84     10000
weighted avg       0.96      0.96      0.96     10000
```

```
1
```