



CSC



STATA® 18



Webinar #6

Diagnostic Test dan Merge

Iis Sinsin, SKM, M.Epid | Sabtu, 21 Oktober 2023 via Zoom Platform jam 10

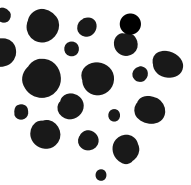






Diagnostic Test

Receiver Operating Characteristic (**ROC**) Curve Analysis for Medical **Diagnostic Test** Evaluation.



- Sensitivitas
 - Spesifisitas
 - Positive Predictive Value (PPV)
 - Negative Predictive Value (NPV)
 - Receiver Operating Characteristic (ROC)
 - Area under ROC (AUROC)
- 
- 
- 

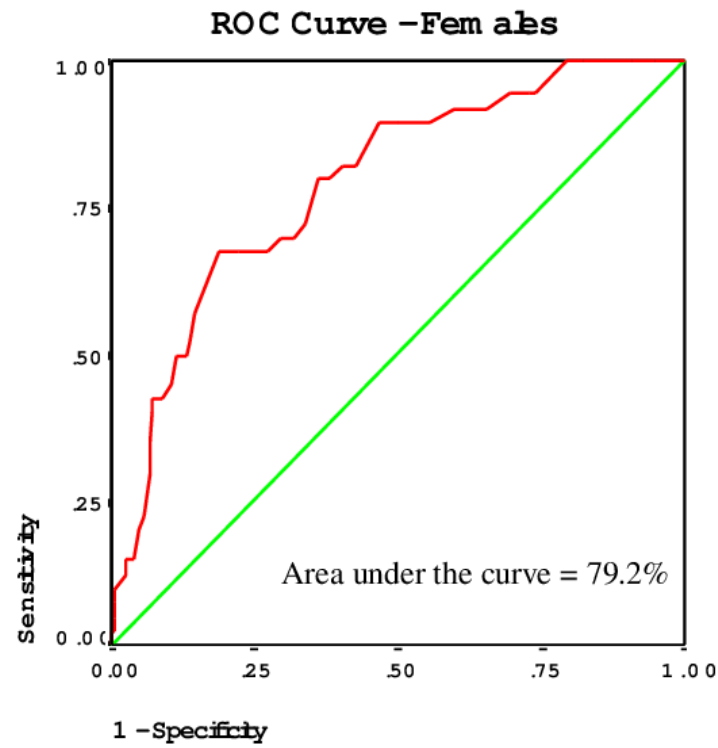
Diagnostic Test

Menentukan berapa cut off atau sebuah nilai dimana nilai tersebut merupakan batas tak wajar

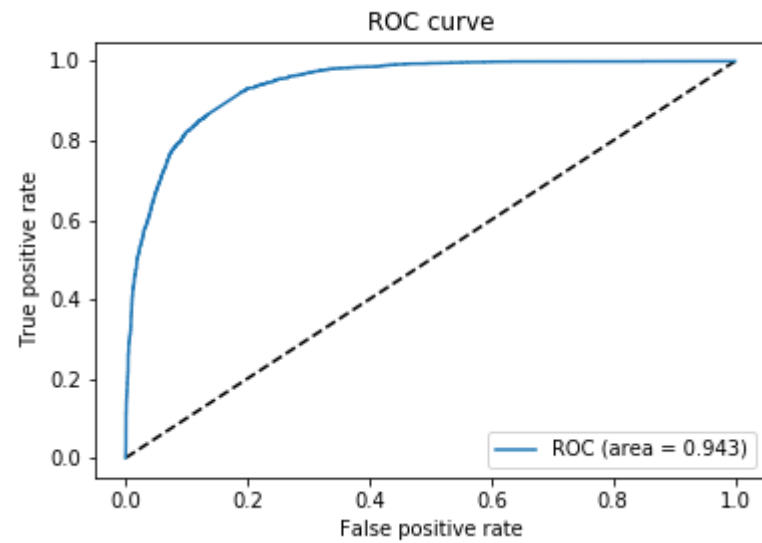
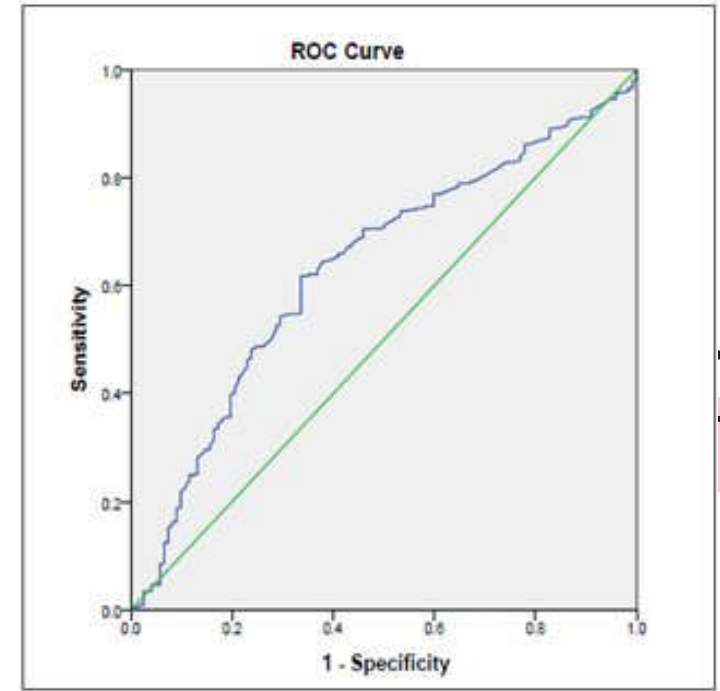
- Misal berapa tekanan darah Sistolik dikatakan masalah? Sistolik >140
 - Berapa usia dikatakan Lansia? Usia >65
 - Berapa nilai mahasiswa dikatakan cum laude ?
IPK >3.75
- Dan lainnya

Variasi ROC

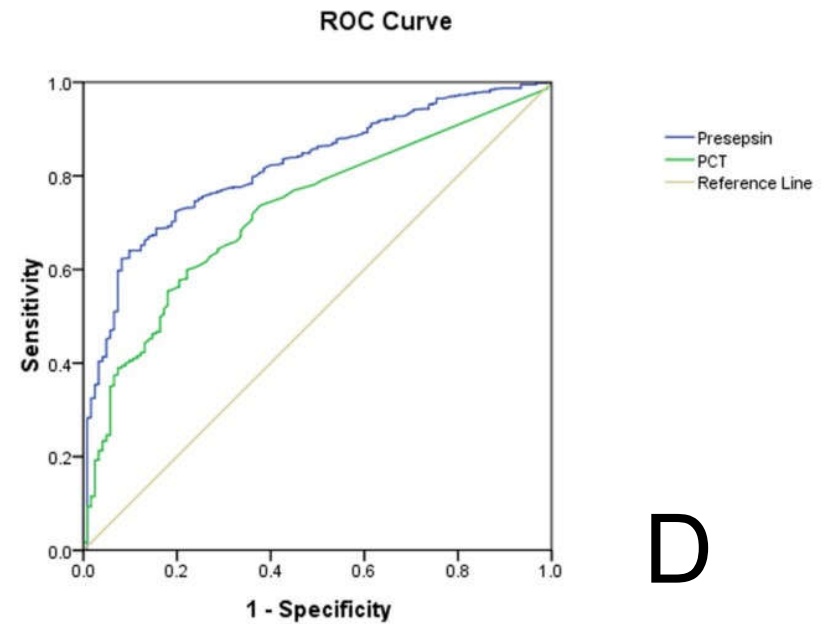
A



B



C



D

Klasifikasi ROC

ROC score	Evaluation
$0.9 < AUC \leq 1.0$	Excellent
$0.8 < AUC \leq 0.9$	Good
$0.7 < AUC \leq 0.8$	Fair
$0.6 < AUC \leq 0.7$	Poor
$AUC \leq 0.6$	Fail

Sensitivitas dan Spesifisitas

		The Truth		
		Has the disease	Does not have the disease	
Test Score:	Positive	True Positives (TP) a	False Positives (FP) b	$PPV = \frac{TP}{TP + FP}$
	Negative	False Negatives (FN) c	True Negatives (TN) d	$NPV = \frac{TN}{TN + FN}$

Sensitivity

$$\frac{TP}{TP + FN}$$

Or,

$$\frac{a}{a + c}$$

Specificity

$$\frac{TN}{TN + FP}$$

Or,

$$\frac{d}{d + b}$$

Diagnostic Test

		Gold standar (USG)		Total
		Hamil	Tidak hamil	
Test (urin)	Positif	30	20	50
	Negatif	10	40	50
Total		40	60	100

Sensitivitas = $30/40 = 75\%$; dari 40 ibu hamil diagnosis dokter, 75% didetect oleh test urin

Spesifisitas = $40/60 = 67\%$ dari 60 ibu TIDAK hamil diagnosis dokter, 67% didetect oleh test urin; **ROC???? Hitung pakai Stat**

Di Stata menghitung Sen, Spe, ROC/AUROC (data ROC.dta)

.des

Variable name	Storage type	Display format	Value label	Variable label
id	float	%9.0g		nomor identitas
sistolik	int	%8.0g		tekanan sistolik
diastol	int	%8.0g		tekanan diastolik
gender	byte	%8.0g		laki=1 perempuan =0
usia	float	%9.0g		usia <50=0 usia 50
keatas=1				
dokter	float	%9.0g		hipertensi =1 tidak=0
massaotot	float	%9.0g		massa otot

Analisis: Diagnosis dokter gold standar.

Sistolik, diastolic sebagai variable kontinyu yang ingin dicari berapa Sen, Spe dan ROCnya

Di Stata menghitung Sen, Spe, ROC/AUROC (data ROC.dta)

```
. logistic dokter sistolik
```

```
Logistic regression
```

```
Log likelihood = -102.88515
```

```
Number of obs = 149  
LR chi2(1) = 0.78  
Prob > chi2 = 0.3769  
Pseudo R2 = 0.0038
```

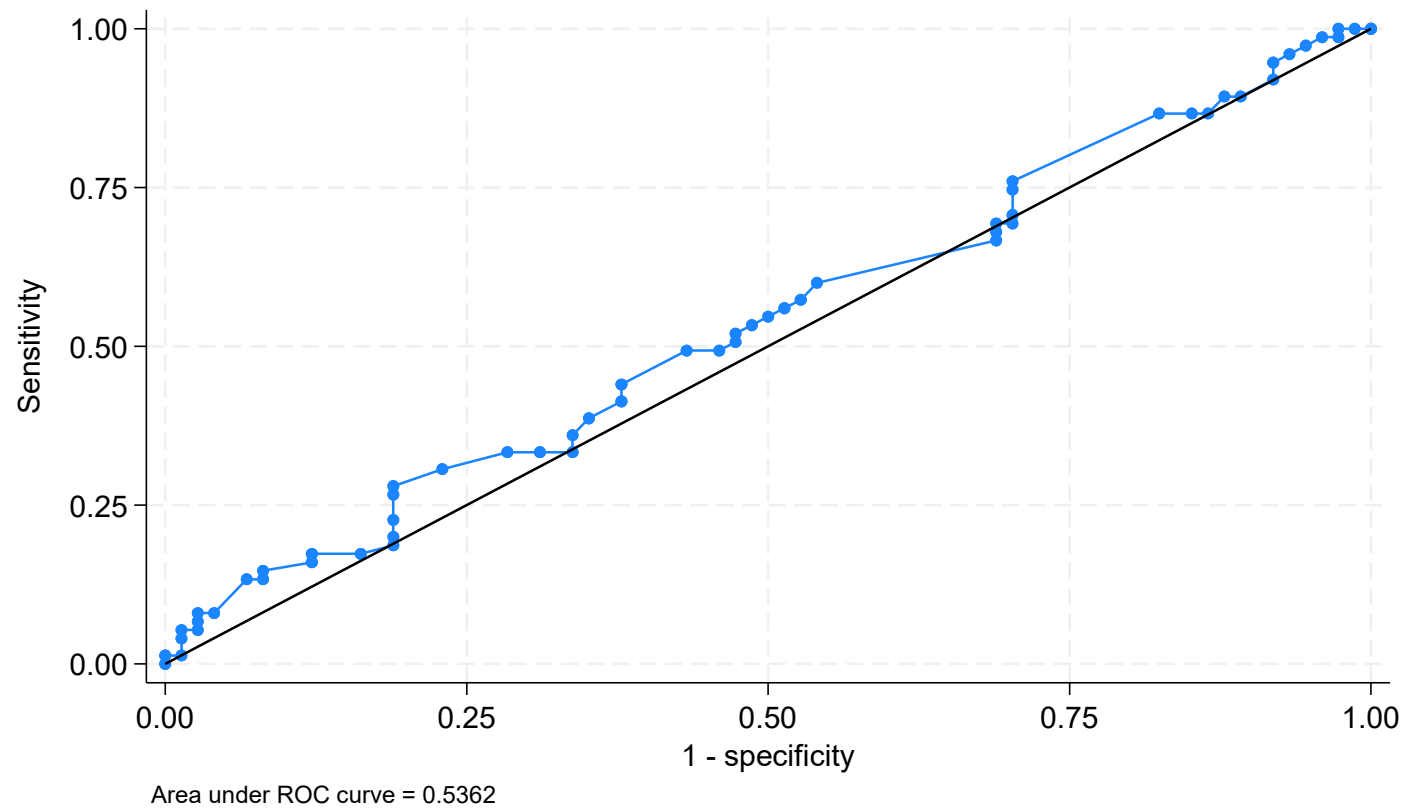
dokter	Odds ratio	Std. err.	z	P> z	[95% conf. interval]	
sistolik	1.007156	.008162	0.88	0.379	.9912851	1.023281
_cons	.4117093	.4269024	-0.86	0.392	.0539483	3.141982

```
Note: _cons estimates baseline odds.
```

Di Stata menghitung Sen, Spe, ROC/AUROC (data ROC.dta)

```
. lroc
```

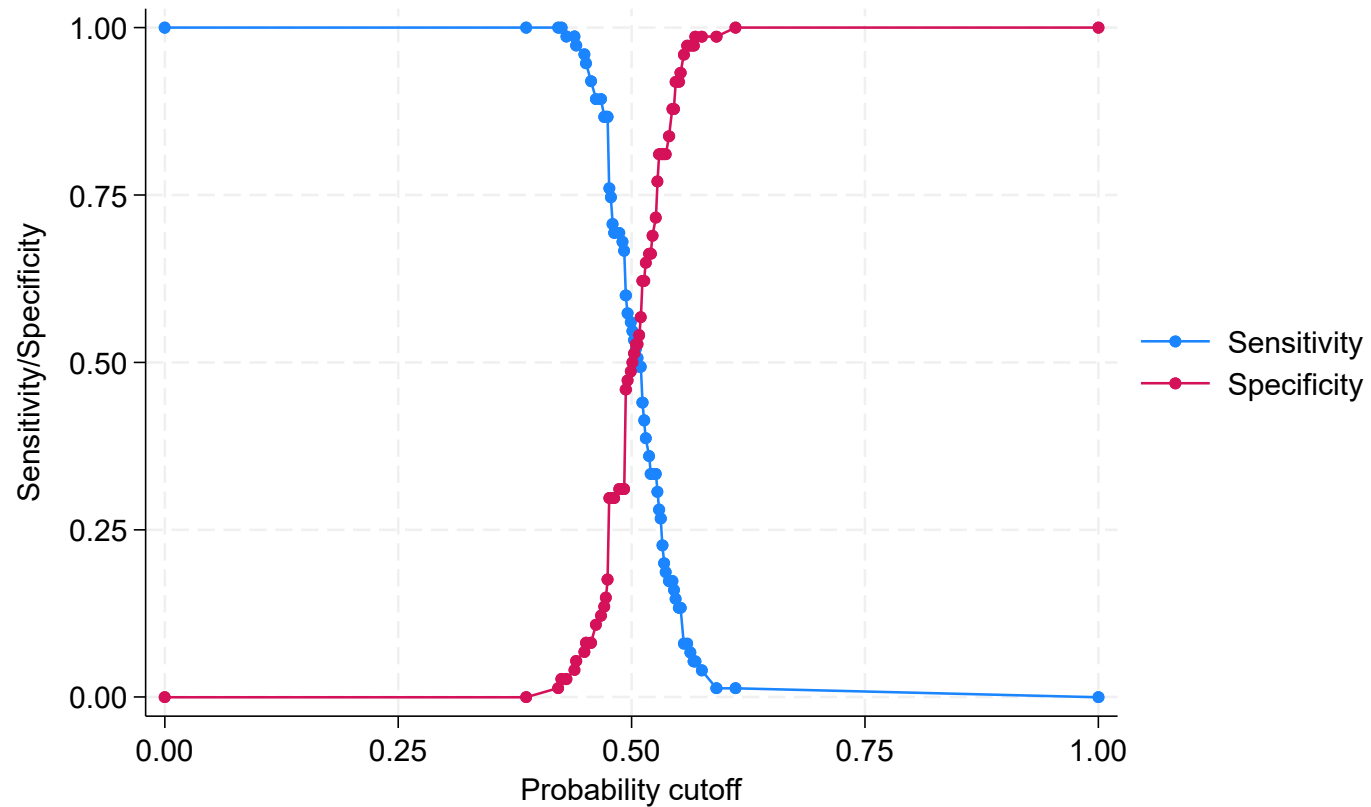
Sistolik



Di Stata menghitung Sen, Spe, ROC/AUROC (data ROC.dta)

. lsens

Sistolik



Di Stata menghitung Sen, Spe, ROC/AUROC (data ROC.dta)

```
.roctab dokter sistolik , table detail
```

```
. Detailed report of sensitivity and specificity
```

Cutpoint	Sensitivity	Specificity	Correctly classified	LR+	LR-
(>= 60)	100.00%	0.00%	50.34%	1.0000	
(>= 80)	100.00%	1.35%	51.01%	1.0137	0.0000
(>= 82)	100.00%	2.70%	51.68%	1.0278	0.0000
(>= 85)	98.67%	2.70%	51.01%	1.0141	0.4933
(>= 90)	98.67%	4.05%	51.68%	1.0284	0.3289
(>= 91)	97.33%	5.41%	51.68%	1.0290	0.4933
(>= 96)	96.00%	6.76%	51.68%	1.0296	0.5920

Sistolik

```
BREAK
```

(>= 160)	6.67%	97.30%	51.68%	2.4667	0.9593
(>= 162)	5.33%	97.30%	51.01%	1.9733	0.9730
(>= 163)	5.33%	98.65%	51.68%	3.9467	0.9596
(>= 167)	4.00%	98.65%	51.01%	2.9600	0.9732
(>= 176)	1.33%	98.65%	49.66%	0.9867	1.0002
(>= 188)	1.33%	100.00%	50.34%	0.9867	0.9867
(> 188)	0.00%	100.00%	49.66%	1.0000	1.0000

Obs	ROC area	Std. err.	Asymptotic normal [95% conf. interval]
149	0.5362	0.0474	0.44325 0.62918

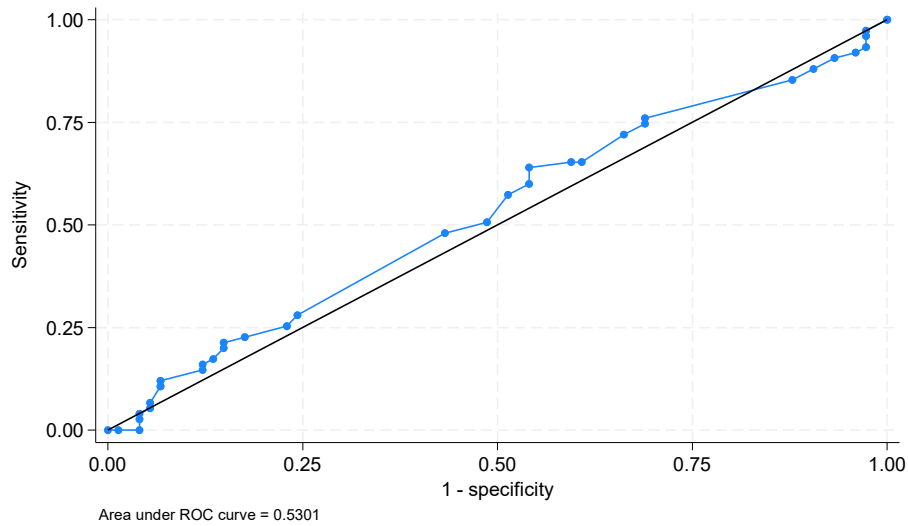
Di Stata menghitung Sen, Spe, ROC/AUROC (data ROC.dta)

```
. cutpt dokter sistolik , noadjust
```

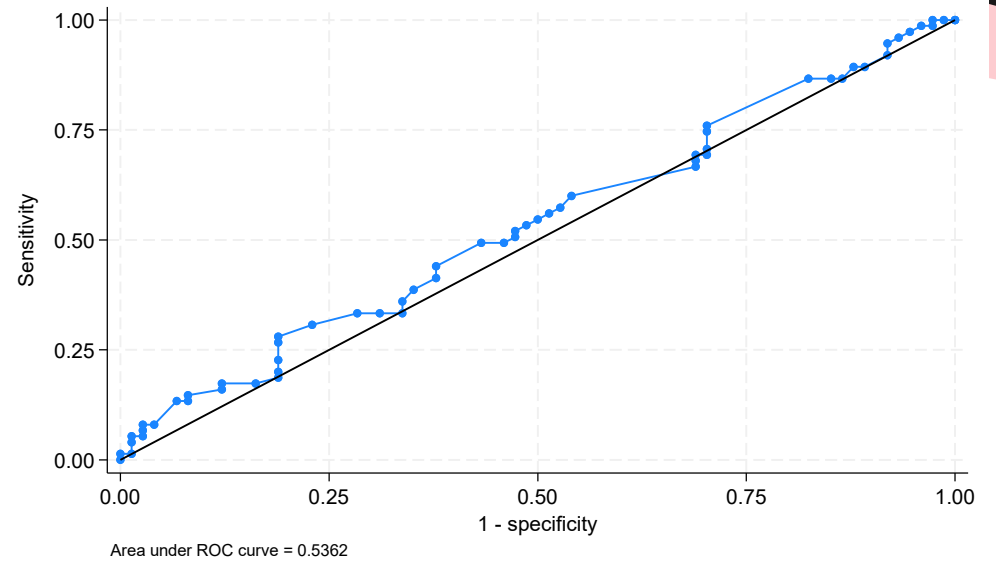
```
Empirical cutpoint estimation
```

```
Method:                               Liu  
Reference variable:                   dokter (0=neg, 1=pos)  
Classification variable:              sistolik  
Empirical optimal cutpoint:           129  
Sensitivity at cutpoint:               0.49  
Specificity at cutpoint:               0.57  
Area under ROC curve at cutpoint:     0.53
```

Apakah diastole dan massa otot ROC lebih baik?



Diastolik



Massa otot

logistic dokter diastol
lroc
logistic dokter massaotot
lroc

Contoh : Stata webuse lbw.dta

```
. webuse lbw
```

```
. logistic low age
```

Logistic regression

Number of obs = 189
LR chi2(1) = 2.76
Prob > chi2 = 0.0966
Pseudo R2 = 0.0118

Log likelihood = -115.95598

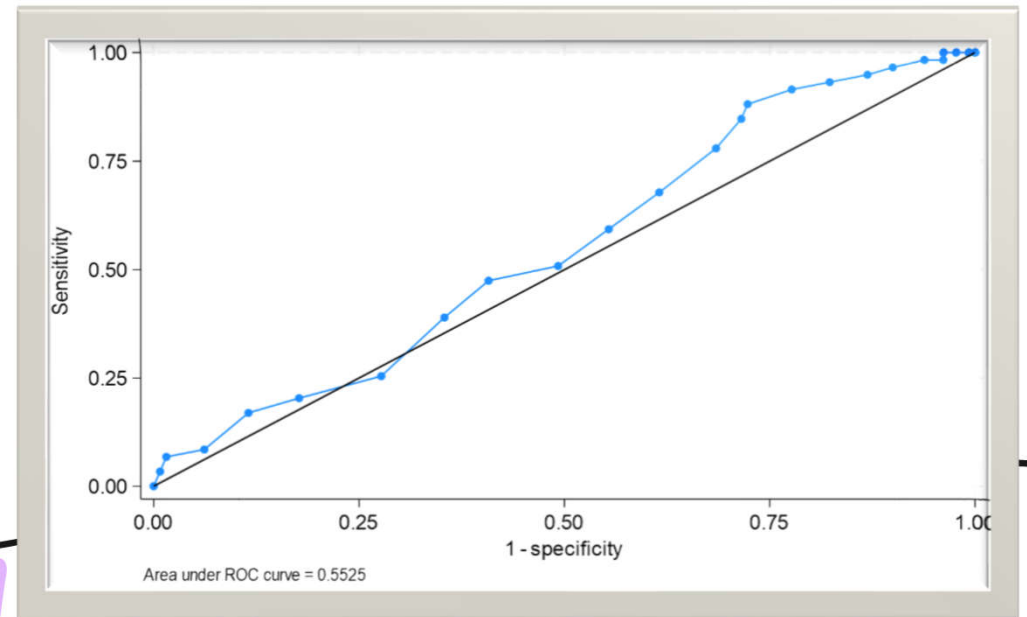
low	Odds ratio	Std. err.	z	P> z	[95% conf. interval]
age	.9501333	.0299423	-1.62	0.105	.8932232 1.010669
_cons	1.469	1.075492	0.53	0.599	.3498129 6.168901

Note: _cons estimates baseline odds.

```
. lroc
```

Logistic model for low

Number of observations = 189
Area under ROC curve = 0.5525






Merge



Merge = Menggabungkan 2 data atau lebih



2 tipe Merge secara umum:

- Gabung jumlah sample (append)
 - Gabung variable (merge)
- 
- 
- 

Command Merge dalam Stata: Append

```
use "C:\Webinar #6\data ROC=149.dta"  
  
keep in 1/100  
  
save "C:\Webinar #6\roc1.dta"  
  
use "C:\Webinar #6\data ROC=149.dta", clear  
  
keep in 101/149  
  
save "C:\Webinar #6\roc2.dta"  
  
use "C:\Webinar #6\roc1.dta"  
  
append using "C:\Webinar #6\roc2.dta"  
  
summ  
  
save "C:\Webinar #6\gabung roc1 roc2.dta"
```

Command Merge dalam Stata: Merge

```
use "C:\Webinar #6\data ROC=149.dta", clear

keep id sistolik diastol

save "C:\Webinar #6\id sis dias.dta"

use "C:\Webinar #6\data ROC=149.dta", clear

keep id gender usia dokter massaotot

save "C:\Webinar #6\id gender dll.dta"

use "C:\Webinar #6\id sis dias.dta"
merge 1:1 id using "C:\Webinar #6\id gender dll.dta"

summ

save "C:\Webinar #6\gabung hipertensi.dta"
```



Mari praktekan





THANKS!



DO YOU HAVE ANY QUESTIONS?
MOHON SCAN UNTUK EVALUASI WEBINAR



Terima Kasih

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