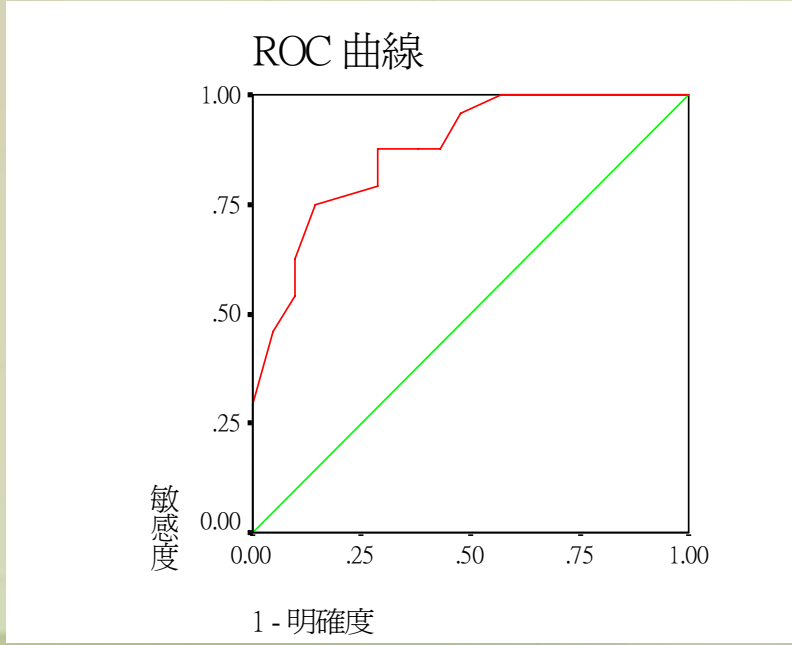
# Diagnosis

## Roc Curve

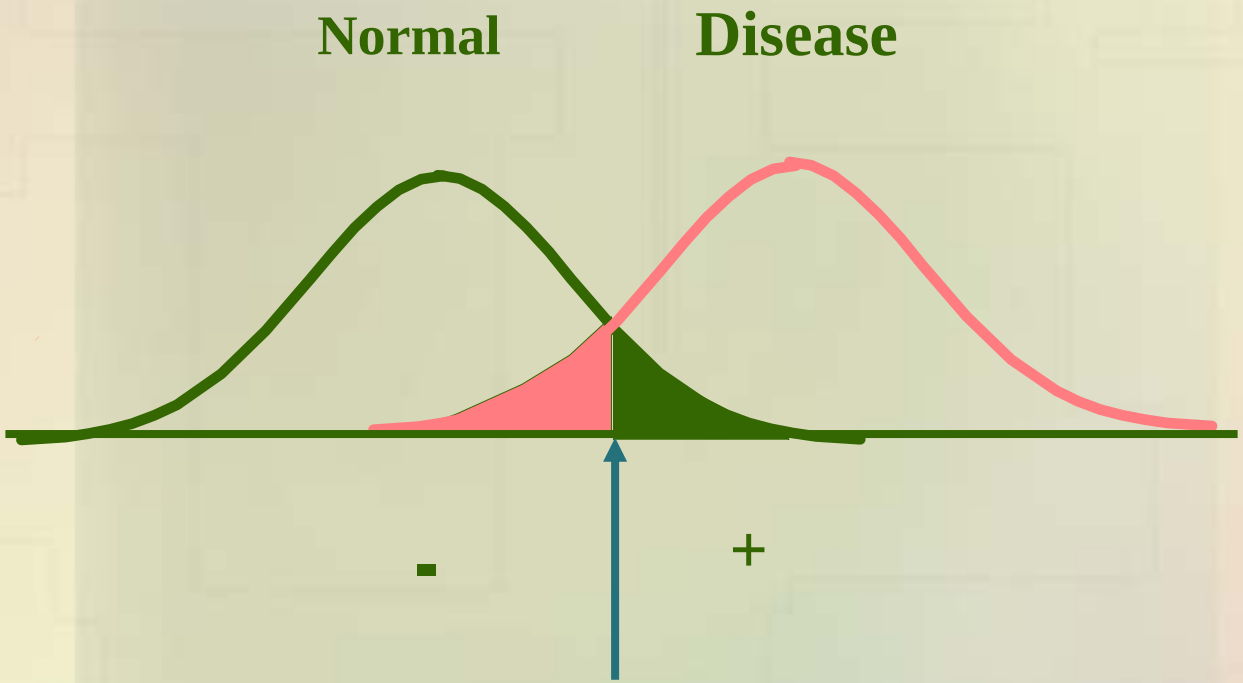
# ROC Curve

The ROC Curve procedure provides a useful way to evaluate the performance of classification schemes that categorize cases into one of two groups



# Sensitivity and Specificity

Sensitivity = P(+|D) ; Specificity = P(-|H)



# Sensitivity and Specificity

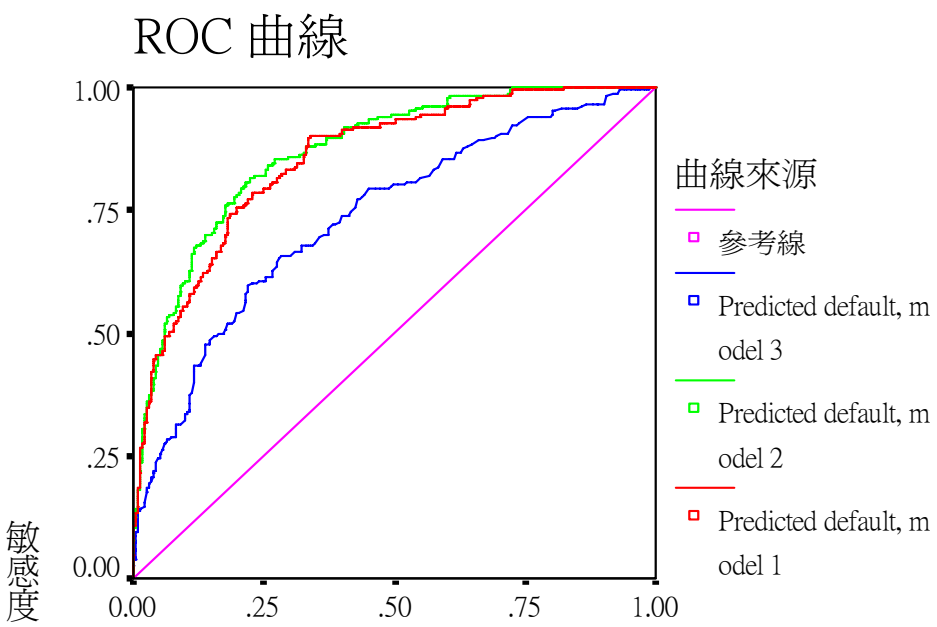
| Test results | True Status（Golden Standard） | | |
|---|---|---|---|
| | Diseased | Not Diseased | Total |
| Positive | a | b | a + b |
| Negative | c | d | c + d |
| Total | a + c | b + d | a + b + c + d |

# ROC : Example 1

This is a hypothetical data file that concerns the efforts of a pharmaceutical lab to develop a rapid assay for detecting HIV infection. The results of the 3 assays are 10 deepening shades of red, with deeper shades indicating greater likelihood of infection. A laboratory trial was conducted on 200 blood samples, half of which were infected with HIV, and half of which were clean. (SPSS11)

| Disease | Assay1 | Assay2 | Assay3 |
|---|---|---|---|
| 1 | 0.80839 | 0.78863 | 0.21304 |
| 0 | 0.1983 | 0.12846 | 0.4369 |
| 0 | 0.01004 | 0.00299 | 0.14102 |
| 0 | 0.02214 | 0.01028 | 0.10442 |
| 1 | 0.78159 | 0.73788 | 0.4369 |

# ROC Curve 1-1




依等值結產生對角線區段。

# ROC : Example 2

**Fever:**

**A physician is interested in predicting whether or not patients will have the symptom of fever. You have proposed a model that is based on a subset of the two available biochemical predictors, Use ROC Curve to compare the predictive abilities of these two models. (NCSS)**

# ROC : Example 3

**Bank-loan :**

**A bank is interested in predicting whether or not customers will default on loans. You have proposed a model that is based on a subset of the available predictors, and you now need to show that its results are better than those from a simpler model currently in use and no worse than results from a more complex model. Use ROC Curve to compare the predictive abilities of these three models. (SPSS11)**