# ch-4

*LinMod*

*Tuesday, September 16, 2014*

**Ex 4-1** Estimate the true probability of having a disease, given that you tested positive.

```
D <-1/1000 # Probability of disease
TD <- 0.99
T_not_D <- 0.05

post <- (TD*D)/(TD*D + T_not_D*(1-D))
```

The probability that you have the disease, given that you test positive, is 0.0194. Now, we perform the same procedure, but this time, the prior distribution is the posterior from our previous calculation.

**Ex 4-2** Now, given that you tested negative, the probability that you have the disease is 2.0859 $\times$ 10-4. Chances are pretty good you don't have anything!

**Ex 4-3** Suppose a population of 100,000 people. Our distribution would look like Table 1, below.

| | Disease | No Disease |
|---|---|---|
| Negative Test | 99 | 4995 |
| Positive Test | 1 | 94905 |