Prior distribution study

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Set up

Seed = 2021;
The number of sampling times is 1000;

Parameters

Prior distribution $\theta \sim Beta(\alpha, \beta)$, Y$\sim Bin(100, \theta)$;
Observed data is 82 responses in the first cohort of 100 patients;

Scenario 1:

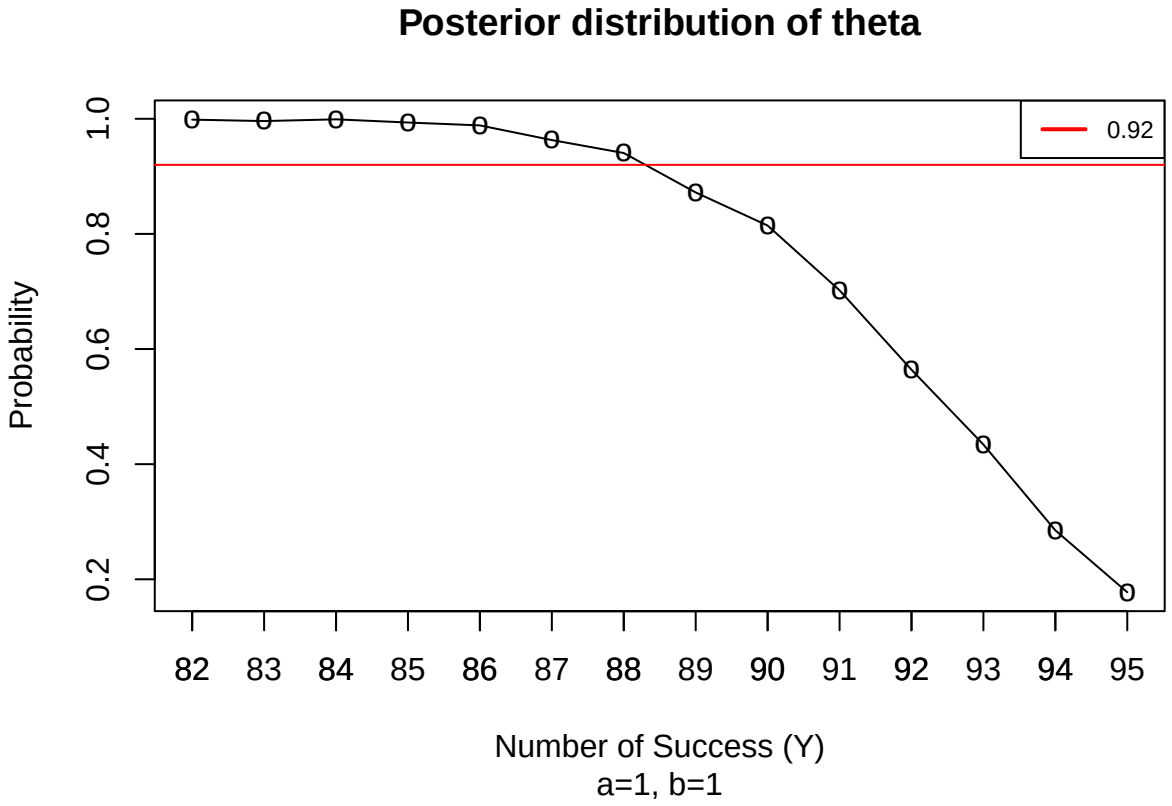
$\alpha = 1, \beta = 1$

- Mean and Variance of Beta(1,1)

```
## [1] "mean =  0.5"
```

```
## [1] "variance =  0.0833333333333333"
```

- Posterior plot for number of success from 82 to 95



- Threshhold value

```
## [1] "P|Y=88: 0.9405"
```

```
## [1] "P|Y=89: 0.872"
```

Scenario 2:

$\alpha = 0.09, \beta = 0.01$

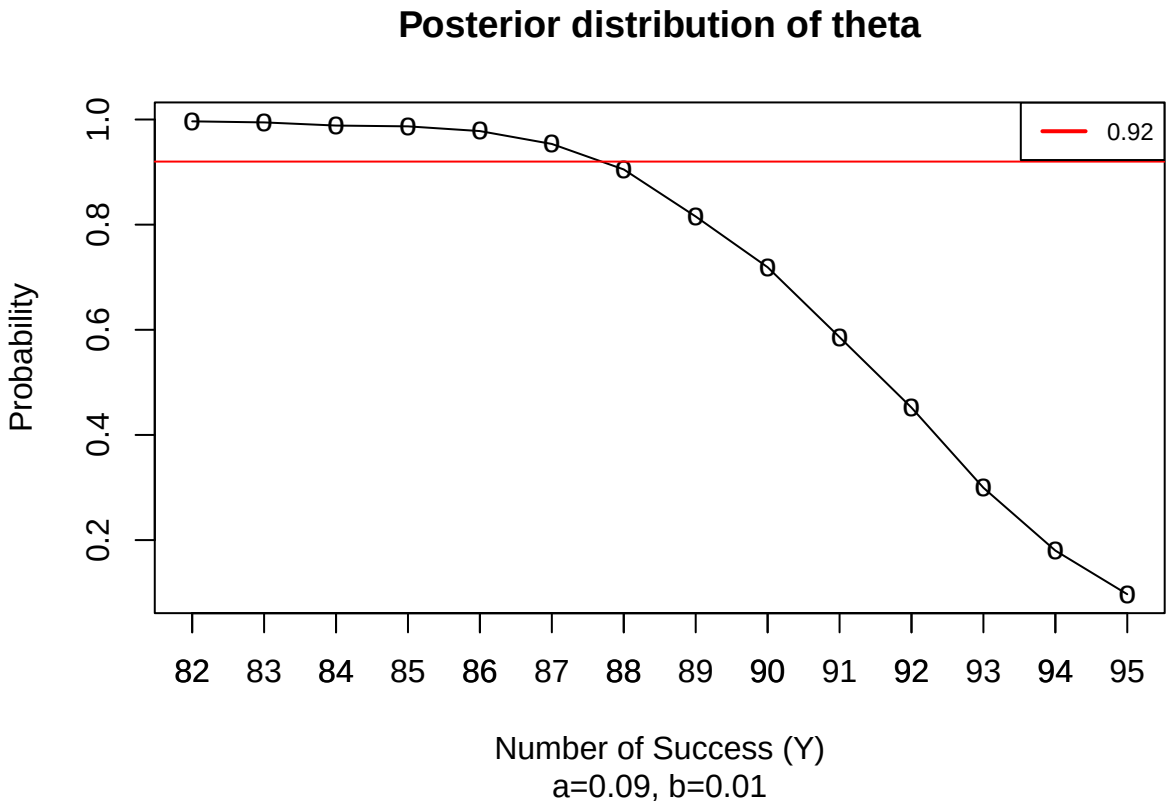
- Mean and Variance of Beta(0.09,0.01)

```
## [1] "mean =  0.9"
```

```
## [1] "variance =  0.0818181818181818"
```

Mean is 0.9, and variance is roughly the same as Beta(1,1)

- Posterior plot for number of success from 82 to 95



- Threshhold value

```
## [1] "P|Y=87: 0.9535"
```

```
## [1] "P|Y=88: 0.905"
```

Scenario 3:

$\alpha = 0.0087, \beta = 0.0015$

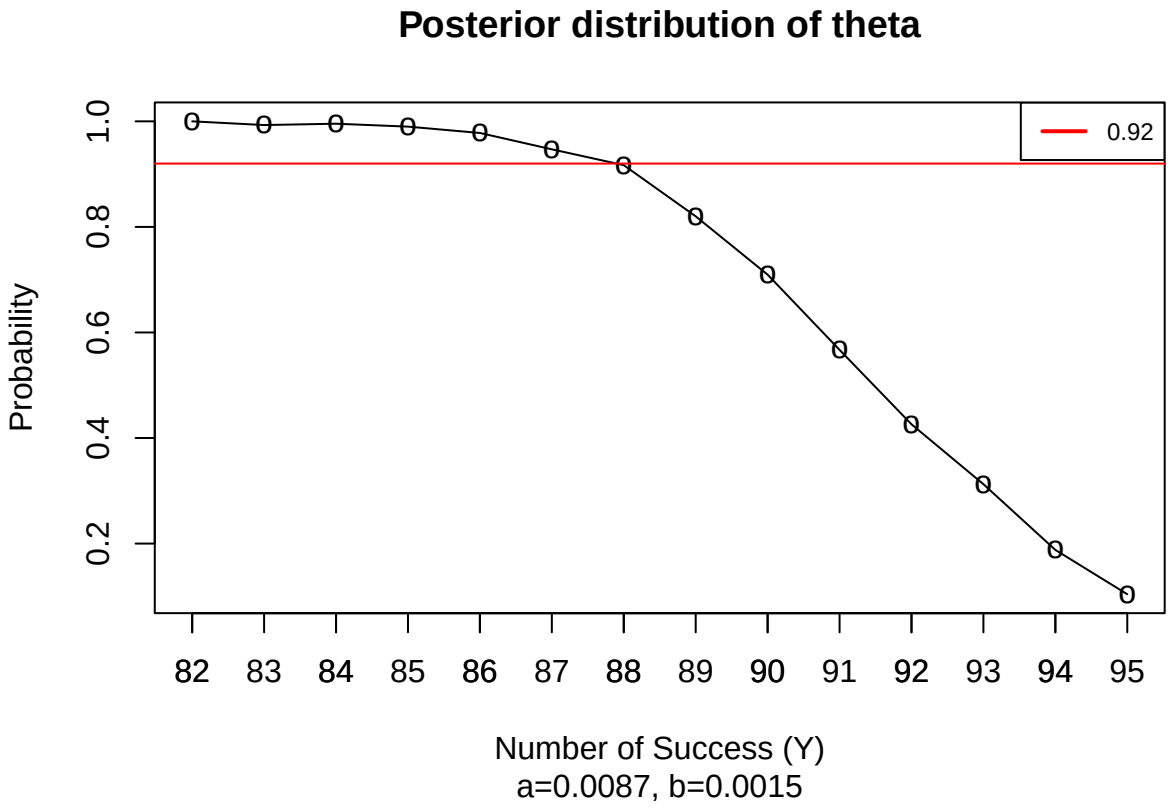
- Mean and Variance of Beta(0.0087,0.0015)

```
## [1] "mean =  0.852941176470588"
```

```
## [1] "variance =  0.124166032420864"
```

Mean is 0.85, and variance is higher.

- Posterior plot for number of success from 82 to 95



- Threshhold value

```
## [1] "P|Y=88: 0.917"
```

```
## [1] "P|Y=89: 0.82"
```

Scenario 4:

$\alpha = 90, \beta = 10$

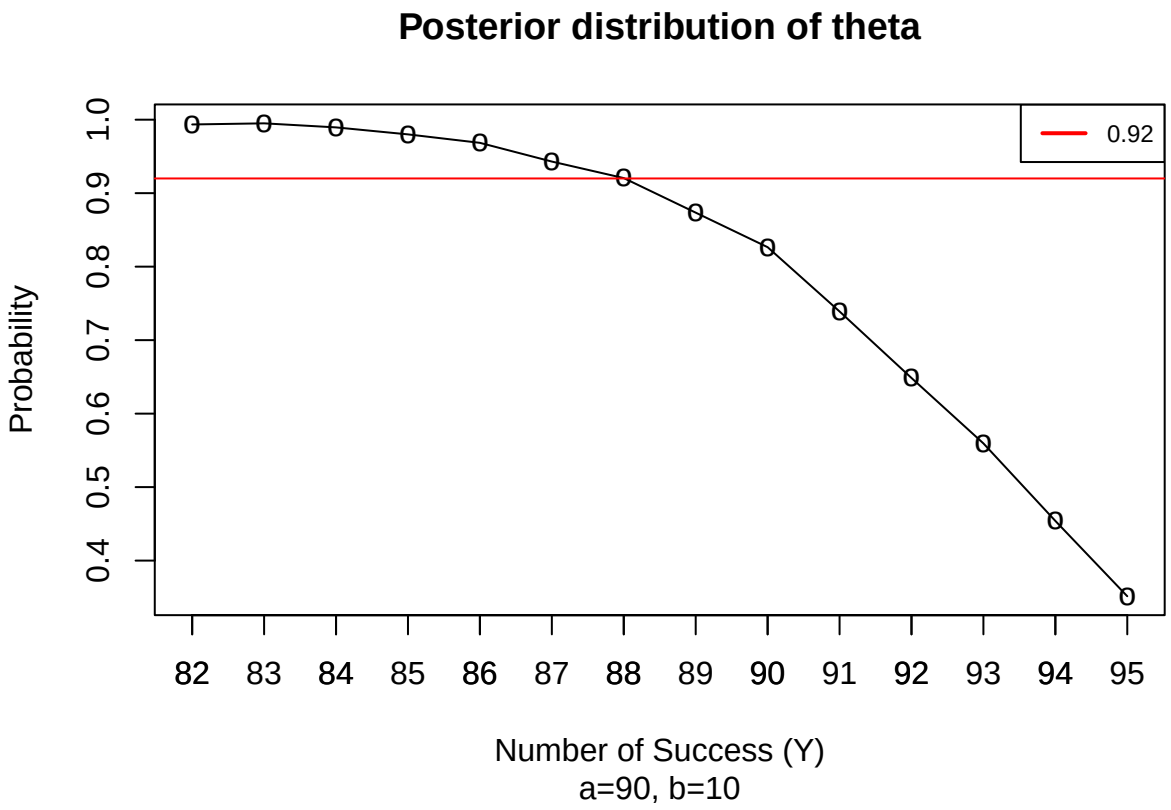
- Mean and Variance of Beta(90,10)

```
## [1] "mean =  0.9"
```

```
## [1] "variance =  0.000891089108910891"
```

Mean is 0.9, and variance is way lower.

- Posterior plot for number of success from 82 to 95



- Threshhold value

```
## [1] "P|Y=88: 0.9205"
```

```
## [1] "P|Y=89: 0.8735"
```