Posterior distribution describes our state of knowledge about the parameter after observing data.

$\Theta | X_1, \ldots, X_n \sim$ Posterior Distribution

(for Binomial example with Beta(α, β) prior:

$\Theta | X_1, \ldots, X_n \sim \underbrace{\text{Beta}(\alpha + x, \beta + n - x)}$

this is the posterior distribution

It's often easier to think about point and interval estimates than the full posterior distribution.

Common choices for point estimates:

- Posterior mean: ~~posterior of~~ mean of posterior distribution
- Posterior median: median of posterior distribution
- Posterior mode . . . .

Interval Estimates referred to as <u>Credible Intervals</u>

Often, percentiles of the posterior distribution.

Ex: 2.5th percentile and 97.5th percentile of the posterior distribution form a 95% credible interval for Θ.

Interpretation: ~~After observing the data~~, there is a probability 0.95 that the parameter Θ is in the interval.