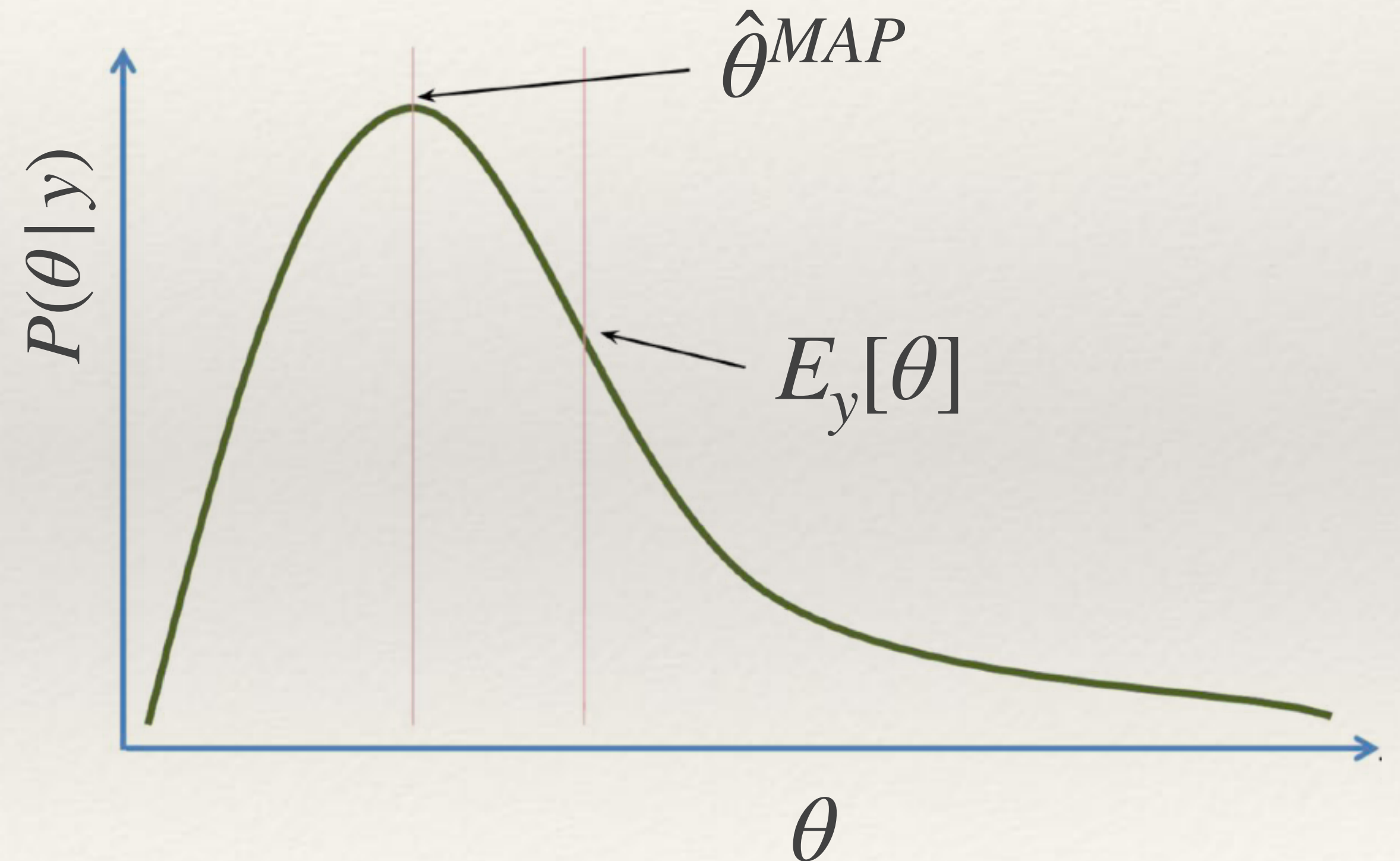# POSTERIOR ESTIMATORS

- Bayesian equivalent to MLE is the **M**aximum **A P**osteriori (MAP):

$$\hat{\theta}^{MAP} = \operatorname*{argmax}_{\theta \in \Omega} \left[P(\theta | y) \right]$$

- The posterior mean is more common:

$$E_y[\theta] = \sum_{\theta \in \Omega} \theta P(\theta | y)$$

(Posterior median is also used occasionally.)

POSTERIOR APPROXIMATIONS

- For a small number of models we can write the posterior distribution directly (really small, don't bother).

- For most models, we use posterior samples to approximate the posterior.

$$\{\theta_1, \cdots, \theta_N\} \sim P(\theta|y)$$

Unknown distribution