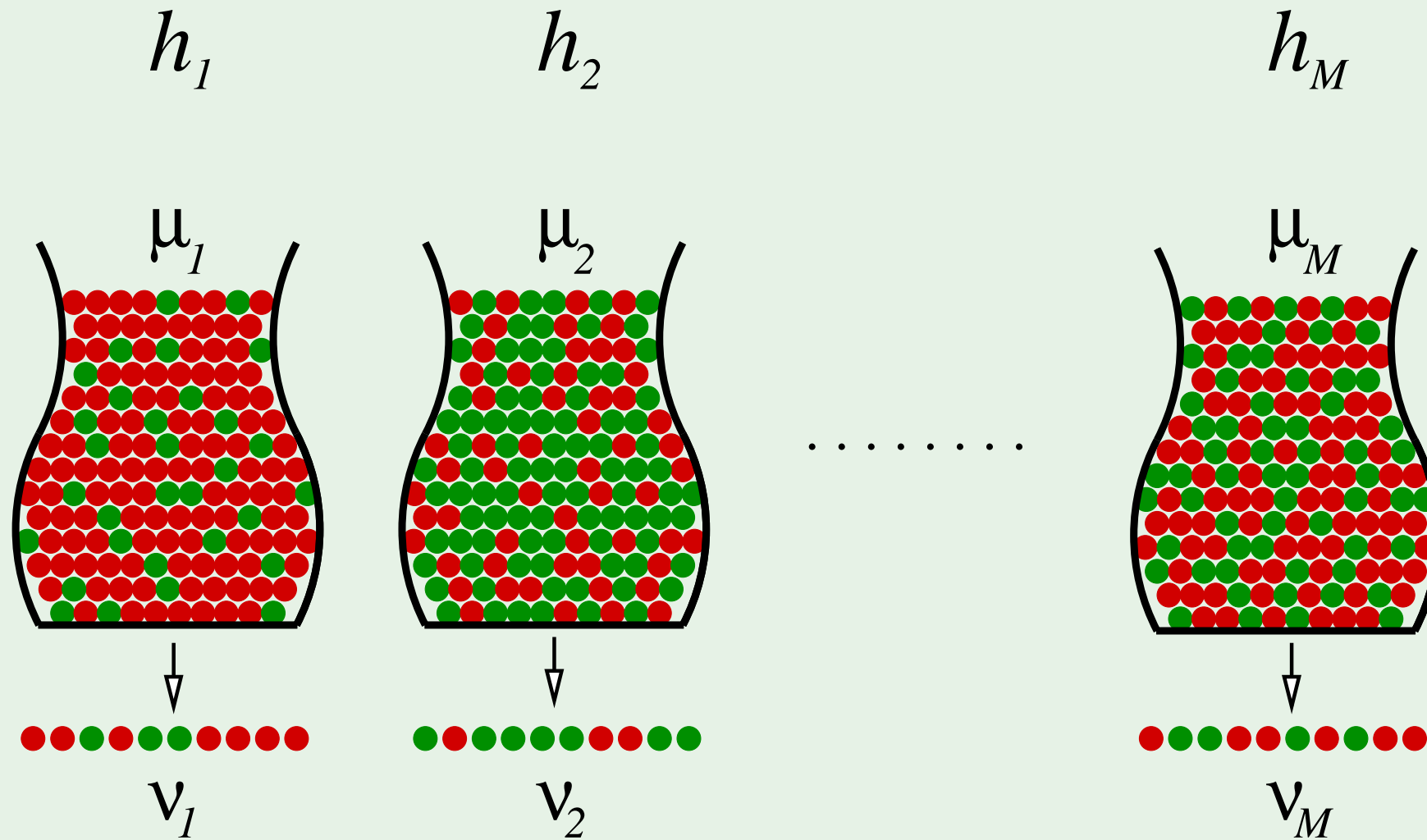


# Multiple bins

Generalizing the bin model to more than one hypothesis:



# Notation for learning

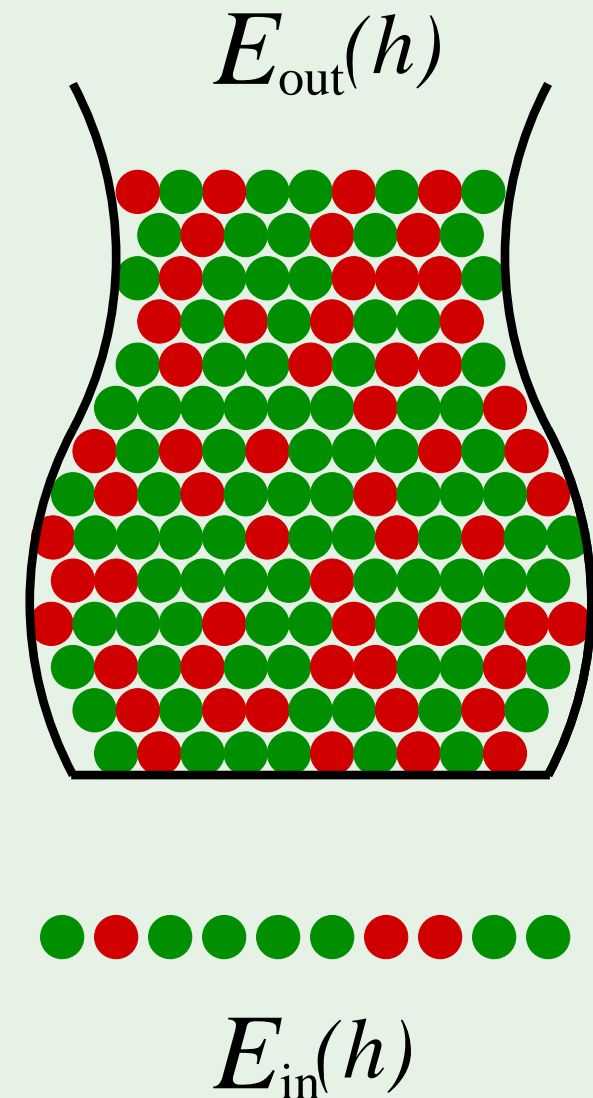
Both  $\mu$  and  $\nu$  depend on which hypothesis  $h$

$\nu$  is 'in sample' denoted by  $E_{\text{in}}(h)$

$\mu$  is 'out of sample' denoted by  $E_{\text{out}}(h)$

The Hoeffding inequality becomes:

$$\mathbb{P} \left[ |E_{\text{in}}(h) - E_{\text{out}}(h)| > \epsilon \right] \leq 2e^{-2\epsilon^2 N}$$



# Notation with multiple bins

