

$$P(G = \text{wet}) = pq_{\text{yes}}w_{\text{yes,on}} + p(1 - q_{\text{yes}})w_{\text{yes,off}} \\ + (1 - p)q_{\text{no}}w_{\text{no,on}} + (1 - p)(1 - q_{\text{no}})w_{\text{no,off}}$$