

$$P(A|C) = p/(1+p)$$

$$P_{\text{root}} = P(C) = pP(\Xi_0^{-1} \in \mathbb{N}^3 | \Xi_0 \text{ is chosen}) + (1-p)P(\Xi_0^{-1} \in \mathbb{N}^3 | \Xi_0 \text{ is chosen})$$
$$= p \frac{2}{3} + (1-p) \frac{1}{3} = \frac{1}{3}(1+p)$$

$$P(ANC) = pP(A \cap \Xi_0^{-1} \in \mathbb{N}^3 | \Xi_0 \text{ is chosen})$$
$$+ (1-p)P(A \cap \Xi_0^{-1} \in \mathbb{N}^3 | \Xi_0 \text{ is chosen})$$
$$= p \frac{1}{3} + (1-p) \cdot 0 = p \frac{1}{3}$$

$$\therefore P(A|C) = \frac{P(ANC)}{P(C)} = \frac{p \frac{1}{3}}{\frac{1}{3}(1+p)}$$