

151. For a multi-state model with three states, Healthy (0), Disabled (1), and Dead (2):

(i) For $k = 0, 1$:

$$p_{x+k}^{00} = 0.70$$

$$p_{x+k}^{01} = 0.20$$

$$p_{x+k}^{10} = 0.10$$

$$p_{x+k}^{12} = 0.25$$

(ii) There are 100 lives at the start, all Healthy. Their future states are independent.

Calculate the variance of the number of the original 100 lives who die within the first two years.

(A) 11

(B) 14

(C) 17

(D) 20

(E) 23