

Quiz 3

STAT 479

September 16, 2010

1. The number of dental claims during each year for each insured are distributed as a Poisson distribution with a mean of 2.5. The claims can be split between those attributable standard cleanings and those attributable to "other causes" with 90% being attributable to standard cleanings.

Calculate the probability that an insured has more than two claims attributable to "other causes" to other causes during a five year period.

λ for all claims is 2.5 per year

λ for all claims is $2.5 \times 5 = 12.5$ for 5 years

λ for "other causes" is $(12.5)(0.10) = 1.25$ for 5 years

$$\Pr(\# \text{ of Claims for Other Causes} > 2) =$$

$$1 - \Pr(N=0) - \Pr(N=1) - \Pr(N=2)$$

$$= 1 - e^{-1.25} - \frac{e^{-1.25}(1.25)}{1!} - \frac{e^{-1.25}(1.25)^2}{2!}$$

$$= 1 - .86847$$

$$= \underline{\underline{0.13153}}$$

2. The number of auto accidents is distributed as a zero-modified geometric distribution with $\beta = 9$.

The probability of less than 3 claims is 0.757.

Calculate p_0^M .

$$\Pr(\# \text{ of Claims} < 3) = \Pr(N=0) + \Pr(N=1) + \Pr(N=2)$$

$$= p_0^m + (1-p_0^m) p_1^T + (1-p_0^m) (p_2^T)$$

$$= p_0^m + (1-p_0^m) \left(\frac{1}{10}\right) + (1-p_0^m) \left(\frac{1}{10}\right) \left(\frac{9}{10}\right) = 0.757$$

$$p_0^m + 0.1 - 0.1p_0^m + 0.09 - 0.09p_0^m = 0.757$$

$$0.81 p_0^m = 0.757 - 0.19 = 0.567$$

$$p_0^m = \frac{0.567}{0.81} = 0.70$$