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Practice 5.2 (Level 2): Adjusting a Poisson Regression Model for Overdispersion

Task

In this practice, you use the PSCALE option to adjust for possible overdispersion in the Poisson regression model you fit in practice 5.1. The model is based on the **mydata.earinfection** data set. Note: For additional details about the model, see practice 5.1.

Reminder: Make sure you've defined the **mydata** library.

1. Look up the PSCALE option in the SAS online documentation. Use the PSCALE option in the MODEL statement of PROC GENMOD to adjust for the possible overdispersion. What factors are now significant? How do you back-transform the model to obtain the model for the average count of ear infections for female occasional beach swimmers?

```
proc genmod data=mydata.earinfection;
   class Swimmer Location Gender;
   model Infections=Swimmer Location Age Gender /
         dist=poisson link=log type3 pscale;
run;
```

   Examine the results. In the Criteria for Assessing Goodness of Fit table, both the scaled Pearson chi-square (1.00) and the scaled deviance (0.7887) are now close to 1, indicating that overdispersion is no longer a problem for this model.

   As indicated by the last two tables in the results, the significant variables are now **Swimmer** and **Location**. The variable **Age** is no longer significant after adjusting for overdispersion.

   The model for female occasional beach swimmers is:
   log(E(**Infections**)) = 1.392 - 0.4896 - 0.0261 * **Age** + 0.0294 = 0.869 - 0.0261 * **Age**

   It follows that the average number of ear infections for female occasional beach swimmers is:
   E(**Infections**) = $e^{0.869 - 0.0261 * \textbf{Age}}$.

2. In the Poisson model, the parameter estimate for swimmer **Freq** is *-0.6086*. How do you interpret this value?

   Notice that Exp(-0.6086) = 0.544. Comparing frequent swimmers and occasional swimmers, the log of the expected number of ear infections decreases by 0.6086 for frequent swimmers. In other words, the expected number of ear infections for frequent swimmers is 54.4% of the number of ear infections for occasional swimmers

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