Report on Analysis of Effect of Snakes on Vomiting Post-tonsillectomy

Introduction  
Tonsillectomy is a common surgical procedure for children, and they suffer from vomiting after the surgery. Here is the data of vomiting count and related variables. The data contain 19 variables and most of them are self-explanatory: ID, Age, Sex, Weight, Height, BMI, BMIPerc, if child has Post Operative Nausea and Vomiting (PONVChild), if parents have PONV (PONVF), MotionSicknessChild, MotionSicknessF, Smoker, length of snake jelly consumed in 1hr after the surgery (SnakedConsumed1hr), whether child took Oxycodone, mass of Morphine used, VomitCount0, VomitCount2, VomitCount4, VomitCount6. The aim of the analysis is to find chewing on snake affect the incidence of vomiting n children after tonsillectomy in the first 6 hours after surgery.

Methodology  
The dataset was checked for any missing values and any specialties. There are some of value missing in Age, BMI, Height and SnakedConsumed1hr. Then, we sum up the vomit count variables because we are interested in occurrence in first 6 hours. Then, we checked the histogram of total vomit count for any negative values and distribution of data (Fig.1). Since response variable is count and non-negative, we use Poisson regression model. The best model for the data is selected with few comparisons of models after removing the non-significant variables and applying interaction terms. The Pearson residual vs fitted plot will be used to check the violation of assumption of model (Fig. 3).

Results  
The histogram (Fig. 1) shows possibility of zero-inflated data, but deviance and degree of freedom is ratio of 1 in the summary of model, so the data is not over-dispersion. The final model equation is expected (VomitTotalCount) = e ^ (-11.35 + 1.15PONVChild + 0.03BMIPerc + 1.23SnakeConsumed1hrNotconsumed – 0.17Weight + 0.10Height). Models with interaction terms for example, PONVFamily : MotionSicknessF, PONVChild : MotionSicknessChild, MotionSicknessF : Oxycodone, etc. were tested but the final model was selected since it is the simplest and have the lowest AIC and best deviance goodness of fit test. Confidence interval for each variable is in Fig.2. In the plot of fitted values and Pearson residuals (Fig .3) shows that wider span as increase, it maybe there are too many zeros in the data. Other than that final model has relatively low AIC and good result of goodness of fit test.

Discussion  
Based on the final Poisson regression model, the vomiting occurrence is influenced by chewing after tonsillectomy and height, weight, BMIPerc, PONVChild. According to the model, child with no-PONV, consumed less than 10cm jelly would vomit 0.00001. And the vomiting count of child will be  
- about 0.000025 more if children have PONV  
- about 0.0000001 more by 1 percentile of BMI increase  
- about 0.000002 less by 1 unit of weight increase  
- about 0.000001 more by 1 unit of height increase  
- about 0.000028 more if children consumed any snake jelly

Even though we have 279 data but almost half of data have missing values. It would be more precise model if we had that filled.

**Lab Test 5 Appendix**

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**library**(AER)

**library**(pscl)

Sdata = **read.table**("SnakesData(7).txt", header=TRUE)Sdata**$**VomitTotalCount = Sdata**$**VomitingCount0 **+** Sdata**$**VomitingCount2 **+** Sdata**$**VomitingCount4 **+** Sdata**$**VomitingCount6

**hist**(Sdata**$**VomitTotalCount)

Figure 1.

Chart, histogram

Description automatically generated

Sdata.glm = **glm**(VomitTotalCount**~** Age **+** Sex **+** Weight **+** Height **+** BMI **+** BMIPerc **+**  PONVChild **+** PONVFamily **+** MotionSicknessChild **+** MotionSicknessF **+**  Smoker **+** Morphine **+** SnakeConsumed1hr **+** Oxycodone, data=Sdata, family ="poisson"(link=log))**summary**(Sdata.glm)

## ## Call:## glm(formula = VomitTotalCount ~ Age + Sex + Weight + Height + ## BMI + BMIPerc + PONVChild + PONVFamily + MotionSicknessChild + ## MotionSicknessF + Smoker + Morphine + SnakeConsumed1hr + ## Oxycodone, family = poisson(link = log), data = Sdata)## ## Deviance Residuals: ## Min 1Q Median 3Q Max ## -1.7267 -0.6741 -0.4458 -0.2042 2.7092 ## ## Coefficients:## Estimate Std. Error z value Pr(>|z|) ## (Intercept) -18.73171 8.45544 -2.215 0.0267 \*## Age -0.06069 0.21142 -0.287 0.7741 ## SexMale 0.34935 0.37847 0.923 0.3560 ## Weight -0.28079 0.14032 -2.001 0.0454 \*## Height 0.15911 0.06572 2.421 0.0155 \*## BMI 0.24930 0.29526 0.844 0.3985 ## BMIPerc 0.02341 0.01123 2.084 0.0372 \*## PONVChildYes 1.31326 0.57713 2.275 0.0229 \*## PONVFamilyYes 0.02047 0.39172 0.052 0.9583 ## MotionSicknessChildYes 0.66071 0.42609 1.551 0.1210 ## MotionSicknessFYes -0.40825 0.43329 -0.942 0.3461 ## SmokerYes -0.78175 0.54432 -1.436 0.1509 ## Morphine -0.04302 0.26045 -0.165 0.8688 ## SnakeConsumed1hr10-20cm 1.47426 0.75750 1.946 0.0516 .## SnakeConsumed1hr20-30cm 1.33928 0.74977 1.786 0.0741 .## SnakeConsumed1hr30-40cm -0.15092 0.61197 -0.247 0.8052 ## SnakeConsumed1hrNotconsumed 1.36254 0.68093 2.001 0.0454 \*## OxycodoneYes -0.46871 0.46839 -1.001 0.3170 ## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## (Dispersion parameter for poisson family taken to be 1)## ## Null deviance: 142.72 on 129 degrees of freedom## Residual deviance: 101.57 on 112 degrees of freedom## (149 observations deleted due to missingness)## AIC: 189.91## ## Number of Fisher Scoring iterations: 6

**pchisq**(Sdata.glm**$**deviance, df=Sdata.glm**$**df.residual, lower.tail = FALSE)

## [1] 0.7500381

**step**(Sdata.glm, test="LRT")

## Start: AIC=189.91## VomitTotalCount ~ Age + Sex + Weight + Height + BMI + BMIPerc + ## PONVChild + PONVFamily + MotionSicknessChild + MotionSicknessF + ## Smoker + Morphine + SnakeConsumed1hr + Oxycodone## ## Df Deviance AIC LRT Pr(>Chi) ## - PONVFamily 1 101.58 187.91 0.0027 0.958353 ## - Morphine 1 101.60 187.94 0.0271 0.869210 ## - Age 1 101.66 187.99 0.0822 0.774294 ## - BMI 1 102.25 188.58 0.6714 0.412550 ## - Sex 1 102.43 188.77 0.8580 0.354296 ## - MotionSicknessF 1 102.48 188.82 0.9085 0.340505 ## - Oxycodone 1 102.55 188.88 0.9748 0.323496 ## <none> 101.57 189.91 ## - MotionSicknessChild 1 103.88 190.21 2.3031 0.129113 ## - Smoker 1 103.89 190.23 2.3169 0.127978 ## - PONVChild 1 105.96 192.29 4.3848 0.036260 \* ## - Weight 1 106.06 192.40 4.4865 0.034163 \* ## - BMIPerc 1 106.38 192.72 4.8089 0.028313 \* ## - Height 1 108.38 194.72 6.8080 0.009075 \*\*## - SnakeConsumed1hr 4 117.22 197.55 15.6434 0.003537 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=187.91## VomitTotalCount ~ Age + Sex + Weight + Height + BMI + BMIPerc + ## PONVChild + MotionSicknessChild + MotionSicknessF + Smoker + ## Morphine + SnakeConsumed1hr + Oxycodone## ## Df Deviance AIC LRT Pr(>Chi) ## - Morphine 1 101.60 185.94 0.0275 0.868332 ## - Age 1 101.66 185.99 0.0804 0.776793 ## - BMI 1 102.25 186.58 0.6699 0.413081 ## - MotionSicknessF 1 102.48 186.82 0.9075 0.340790 ## - Sex 1 102.50 186.83 0.9219 0.336974 ## - Oxycodone 1 102.58 186.91 0.9991 0.317533 ## <none> 101.58 187.91 ## - MotionSicknessChild 1 103.88 188.21 2.3018 0.129226 ## - Smoker 1 103.92 188.26 2.3458 0.125623 ## - PONVChild 1 106.08 190.42 4.5056 0.033784 \* ## - Weight 1 106.08 190.42 4.5066 0.033764 \* ## - BMIPerc 1 106.64 190.98 5.0672 0.024382 \* ## - Height 1 108.42 192.75 6.8436 0.008896 \*\*## - SnakeConsumed1hr 4 117.41 195.75 15.8328 0.003252 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=185.94## VomitTotalCount ~ Age + Sex + Weight + Height + BMI + BMIPerc + ## PONVChild + MotionSicknessChild + MotionSicknessF + Smoker + ## SnakeConsumed1hr + Oxycodone## ## Df Deviance AIC LRT Pr(>Chi) ## - Age 1 101.68 184.01 0.0723 0.787979 ## - BMI 1 102.27 184.61 0.6669 0.414139 ## - MotionSicknessF 1 102.49 184.83 0.8899 0.345493 ## - Sex 1 102.50 184.84 0.8991 0.343026 ## - Oxycodone 1 102.61 184.94 1.0043 0.316269 ## <none> 101.60 185.94 ## - MotionSicknessChild 1 103.89 186.23 2.2879 0.130388 ## - Smoker 1 103.96 186.29 2.3538 0.124980 ## - PONVChild 1 106.08 188.42 4.4802 0.034289 \* ## - Weight 1 106.13 188.46 4.5219 0.033464 \* ## - BMIPerc 1 106.65 188.98 5.0429 0.024727 \* ## - Height 1 108.44 190.78 6.8399 0.008914 \*\*## - SnakeConsumed1hr 4 117.65 193.98 16.0442 0.002960 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=184.01## VomitTotalCount ~ Sex + Weight + Height + BMI + BMIPerc + PONVChild + ## MotionSicknessChild + MotionSicknessF + Smoker + SnakeConsumed1hr + ## Oxycodone## ## Df Deviance AIC LRT Pr(>Chi) ## - BMI 1 102.37 182.71 0.6947 0.404563 ## - Sex 1 102.54 182.88 0.8648 0.352394 ## - MotionSicknessF 1 102.56 182.89 0.8820 0.347646 ## - Oxycodone 1 102.72 183.06 1.0489 0.305760 ## <none> 101.68 184.01 ## - MotionSicknessChild 1 103.91 184.25 2.2377 0.134684 ## - Smoker 1 103.97 184.31 2.2989 0.129467 ## - PONVChild 1 106.13 186.47 4.4532 0.034836 \* ## - Weight 1 106.47 186.81 4.7986 0.028483 \* ## - BMIPerc 1 107.15 187.49 5.4773 0.019266 \* ## - Height 1 108.90 189.24 7.2281 0.007177 \*\*## - SnakeConsumed1hr 4 117.77 192.10 16.0897 0.002901 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=182.71## VomitTotalCount ~ Sex + Weight + Height + BMIPerc + PONVChild + ## MotionSicknessChild + MotionSicknessF + Smoker + SnakeConsumed1hr + ## Oxycodone## ## Df Deviance AIC LRT Pr(>Chi) ## - MotionSicknessF 1 103.27 181.61 0.9019 0.3422750 ## - Sex 1 103.31 181.64 0.9366 0.3331592 ## - Oxycodone 1 103.35 181.69 0.9812 0.3219064 ## <none> 102.37 182.71 ## - Smoker 1 104.58 182.92 2.2132 0.1368377 ## - MotionSicknessChild 1 104.79 183.12 2.4164 0.1200689 ## - PONVChild 1 106.47 184.81 4.1015 0.0428444 \* ## - SnakeConsumed1hr 4 118.41 190.74 16.0377 0.0029689 \*\* ## - BMIPerc 1 114.56 192.89 12.1873 0.0004812 \*\*\*## - Height 1 119.27 197.60 16.8945 3.952e-05 \*\*\*## - Weight 1 119.86 198.20 17.4933 2.883e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=181.61## VomitTotalCount ~ Sex + Weight + Height + BMIPerc + PONVChild + ## MotionSicknessChild + Smoker + SnakeConsumed1hr + Oxycodone## ## Df Deviance AIC LRT Pr(>Chi) ## - Sex 1 104.16 180.50 0.8888 0.3458141 ## - Oxycodone 1 104.25 180.59 0.9775 0.3228155 ## - Smoker 1 105.02 181.36 1.7504 0.1858285 ## <none> 103.27 181.61 ## - MotionSicknessChild 1 105.39 181.72 2.1145 0.1459074 ## - PONVChild 1 107.60 183.94 4.3278 0.0374943 \* ## - SnakeConsumed1hr 4 118.52 188.85 15.2442 0.0042206 \*\* ## - BMIPerc 1 115.87 192.20 12.5930 0.0003872 \*\*\*## - Height 1 119.62 195.95 16.3448 5.28e-05 \*\*\*## - Weight 1 120.18 196.51 16.9047 3.93e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=180.5## VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + MotionSicknessChild + ## Smoker + SnakeConsumed1hr + Oxycodone## ## Df Deviance AIC LRT Pr(>Chi) ## - Oxycodone 1 105.33 179.67 1.1723 0.2789221 ## - MotionSicknessChild 1 105.98 180.31 1.8159 0.1778041 ## - Smoker 1 106.16 180.50 2.0000 0.1573008 ## <none> 104.16 180.50 ## - PONVChild 1 108.52 182.85 4.3563 0.0368721 \* ## - SnakeConsumed1hr 4 119.39 187.73 15.2325 0.0042426 \*\* ## - BMIPerc 1 117.36 191.69 13.1974 0.0002803 \*\*\*## - Height 1 119.90 194.23 15.7342 7.289e-05 \*\*\*## - Weight 1 120.65 194.98 16.4863 4.900e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=179.67## VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + MotionSicknessChild + ## Smoker + SnakeConsumed1hr## ## Df Deviance AIC LRT Pr(>Chi) ## - MotionSicknessChild 1 106.76 179.10 1.4300 0.2317639 ## - Smoker 1 107.16 179.49 1.8216 0.1771218 ## <none> 105.33 179.67 ## - PONVChild 1 109.06 181.40 3.7301 0.0534414 . ## - SnakeConsumed1hr 4 122.31 188.64 16.9752 0.0019545 \*\* ## - BMIPerc 1 117.78 190.12 12.4501 0.0004180 \*\*\*## - Height 1 120.21 192.55 14.8773 0.0001147 \*\*\*## - Weight 1 121.16 193.50 15.8293 6.932e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=179.1## VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + Smoker + ## SnakeConsumed1hr## ## Df Deviance AIC LRT Pr(>Chi) ## - Smoker 1 108.70 179.04 1.9404 0.1636213 ## <none> 106.76 179.10 ## - PONVChild 1 110.17 180.51 3.4099 0.0648076 . ## - BMIPerc 1 118.19 188.52 11.4229 0.0007254 \*\*\*## - SnakeConsumed1hr 4 124.72 189.06 17.9608 0.0012560 \*\* ## - Weight 1 122.85 193.19 16.0859 6.053e-05 \*\*\*## - Height 1 123.07 193.40 16.3041 5.395e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=179.04## VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + SnakeConsumed1hr## ## Df Deviance AIC LRT Pr(>Chi) ## <none> 108.70 179.04 ## - PONVChild 1 112.73 181.06 4.0225 0.044896 \* ## - BMIPerc 1 118.75 187.08 10.0419 0.001530 \*\* ## - SnakeConsumed1hr 4 126.79 189.12 18.0815 0.001190 \*\* ## - Weight 1 123.82 192.16 15.1184 0.000101 \*\*\*## - Height 1 123.85 192.19 15.1470 9.946e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

## ## Call: glm(formula = VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + ## SnakeConsumed1hr, family = poisson(link = log), data = Sdata)## ## Coefficients:## (Intercept) Weight ## -11.3498 -0.1740 ## Height BMIPerc ## 0.1043 0.0266 ## PONVChildYes SnakeConsumed1hr10-20cm ## 1.1462 0.8557 ## SnakeConsumed1hr20-30cm SnakeConsumed1hr30-40cm ## 1.1421 -0.4701 ## SnakeConsumed1hrNotconsumed ## 1.2251 ## ## Degrees of Freedom: 129 Total (i.e. Null); 121 Residual## (149 observations deleted due to missingness)## Null Deviance: 142.7 ## Residual Deviance: 108.7 AIC: 179

Sdata.glm.new = **glm**(VomitTotalCount **~** PONVChild **+** BMIPerc **+** SnakeConsumed1hr **+** Weight **+** Height, data = Sdata, family = **poisson**(link = log))**summary**(Sdata.glm.new)

## ## Call:## glm(formula = VomitTotalCount ~ PONVChild + BMIPerc + SnakeConsumed1hr + ## Weight + Height, family = poisson(link = log), data = Sdata)## ## Deviance Residuals: ## Min 1Q Median 3Q Max ## -1.6618 -0.7217 -0.4896 -0.2294 3.3180 ## ## Coefficients:## Estimate Std. Error z value Pr(>|z|) ## (Intercept) -11.34981 2.93681 -3.865 0.000111 \*\*\*## PONVChildYes 1.14617 0.50980 2.248 0.024560 \* ## BMIPerc 0.02660 0.00889 2.993 0.002765 \*\* ## SnakeConsumed1hr10-20cm 0.85566 0.64262 1.332 0.183020 ## SnakeConsumed1hr20-30cm 1.14209 0.59688 1.913 0.055691 . ## SnakeConsumed1hr30-40cm -0.47013 0.55641 -0.845 0.398145 ## SnakeConsumed1hrNotconsumed 1.22514 0.60652 2.020 0.043389 \* ## Weight -0.17396 0.05624 -3.093 0.001978 \*\* ## Height 0.10428 0.03065 3.402 0.000669 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## (Dispersion parameter for poisson family taken to be 1)## ## Null deviance: 142.72 on 129 degrees of freedom## Residual deviance: 108.70 on 121 degrees of freedom## (149 observations deleted due to missingness)## AIC: 179.04## ## Number of Fisher Scoring iterations: 6

**pchisq**(**deviance**(Sdata.glm.new) **-** **deviance**(Sdata.glm),2, lower.tail = FALSE)

## [1] 0.02828738

**lrtest**(Sdata.glm.new,Sdata.glm)

## Likelihood ratio test## ## Model 1: VomitTotalCount ~ PONVChild + BMIPerc + SnakeConsumed1hr + Weight + ## Height## Model 2: VomitTotalCount ~ Age + Sex + Weight + Height + BMI + BMIPerc + ## PONVChild + PONVFamily + MotionSicknessChild + MotionSicknessF + ## Smoker + Morphine + SnakeConsumed1hr + Oxycodone## #Df LogLik Df Chisq Pr(>Chisq)## 1 9 -80.520 ## 2 18 -76.955 9 7.1307 0.6235

Sdata.glma = **glm**(VomitTotalCount**~** Age **+** Sex **+** Weight **+** Height **+** BMI **+** BMIPerc **+** PONVChild**\***MotionSicknessChild **+** PONVFamily**+**Oxycodone **+**Smoker **+** MotionSicknessF **+** Morphine **+** SnakeConsumed1hr, data=Sdata, family ="poisson"(link=log))**step**(Sdata.glma, test="LRT")

## Start: AIC=189.32## VomitTotalCount ~ Age + Sex + Weight + Height + BMI + BMIPerc + ## PONVChild \* MotionSicknessChild + PONVFamily + Oxycodone + ## Smoker + MotionSicknessF + Morphine + SnakeConsumed1hr## ## Df Deviance AIC LRT Pr(>Chi) ## - Morphine 1 98.980 187.31 0.0001 0.99230 ## - Age 1 99.076 187.41 0.0966 0.75593 ## - PONVFamily 1 99.086 187.42 0.1070 0.74363 ## - MotionSicknessF 1 99.812 188.15 0.8328 0.36148 ## - BMI 1 99.819 188.15 0.8392 0.35962 ## - Oxycodone 1 100.219 188.55 1.2392 0.26562 ## - Sex 1 100.232 188.57 1.2530 0.26298 ## - Smoker 1 100.440 188.78 1.4604 0.22687 ## <none> 98.979 189.31 ## - PONVChild:MotionSicknessChild 1 101.573 189.91 2.5940 0.10727 ## - Weight 1 104.482 192.82 5.5021 0.01899 \*## - BMIPerc 1 105.556 193.89 6.5770 0.01033 \*## - Height 1 105.593 193.93 6.6133 0.01012 \*## - SnakeConsumed1hr 4 111.846 194.18 12.8661 0.01195 \*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=187.32## VomitTotalCount ~ Age + Sex + Weight + Height + BMI + BMIPerc + ## PONVChild + MotionSicknessChild + PONVFamily + Oxycodone + ## Smoker + MotionSicknessF + SnakeConsumed1hr + PONVChild:MotionSicknessChild## ## Df Deviance AIC LRT Pr(>Chi) ## - Age 1 99.078 185.41 0.0986 0.753510 ## - PONVFamily 1 99.087 185.42 0.1079 0.742597 ## - BMI 1 99.819 186.15 0.8391 0.359650 ## - MotionSicknessF 1 99.866 186.20 0.8861 0.346547 ## - Oxycodone 1 100.220 186.56 1.2401 0.265451 ## - Sex 1 100.239 186.57 1.2590 0.261837 ## - Smoker 1 100.547 186.88 1.5677 0.210546 ## <none> 98.980 187.31 ## - PONVChild:MotionSicknessChild 1 101.601 187.94 2.6210 0.105457 ## - Weight 1 104.484 190.82 5.5046 0.018966 \* ## - BMIPerc 1 105.570 191.91 6.5904 0.010253 \* ## - Height 1 105.697 192.03 6.7172 0.009549 \*\*## - SnakeConsumed1hr 4 112.100 192.44 13.1205 0.010702 \* ## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=185.41## VomitTotalCount ~ Sex + Weight + Height + BMI + BMIPerc + PONVChild + ## MotionSicknessChild + PONVFamily + Oxycodone + Smoker + MotionSicknessF + ## SnakeConsumed1hr + PONVChild:MotionSicknessChild## ## Df Deviance AIC LRT Pr(>Chi) ## - PONVFamily 1 99.189 183.53 0.1113 0.738690 ## - BMI 1 99.886 184.22 0.8077 0.368807 ## - MotionSicknessF 1 99.992 184.33 0.9135 0.339182 ## - Oxycodone 1 100.263 184.60 1.1847 0.276406 ## - Sex 1 100.365 184.70 1.2868 0.256636 ## - Smoker 1 100.728 185.06 1.6494 0.199039 ## <none> 99.078 185.41 ## - PONVChild:MotionSicknessChild 1 101.675 186.01 2.5967 0.107086 ## - Weight 1 104.503 188.84 5.4250 0.019851 \* ## - BMIPerc 1 105.835 190.17 6.7564 0.009341 \*\*## - SnakeConsumed1hr 4 112.765 191.10 13.6864 0.008366 \*\*## - Height 1 107.258 191.59 8.1802 0.004235 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=183.53## VomitTotalCount ~ Sex + Weight + Height + BMI + BMIPerc + PONVChild + ## MotionSicknessChild + Oxycodone + Smoker + MotionSicknessF + ## SnakeConsumed1hr + PONVChild:MotionSicknessChild## ## Df Deviance AIC LRT Pr(>Chi) ## - BMI 1 99.976 182.31 0.7870 0.375011 ## - MotionSicknessF 1 100.045 182.38 0.8558 0.354913 ## - Oxycodone 1 100.274 182.61 1.0850 0.297579 ## - Sex 1 100.700 183.03 1.5104 0.219083 ## - Smoker 1 100.950 183.29 1.7608 0.184527 ## <none> 99.189 183.53 ## - PONVChild:MotionSicknessChild 1 101.676 184.01 2.4865 0.114823 ## - Weight 1 104.629 186.97 5.4401 0.019680 \* ## - BMIPerc 1 106.291 188.63 7.1016 0.007701 \*\*## - Height 1 107.492 189.83 8.3030 0.003958 \*\*## - SnakeConsumed1hr 4 113.635 189.97 14.4452 0.006002 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=182.31## VomitTotalCount ~ Sex + Weight + Height + BMIPerc + PONVChild + ## MotionSicknessChild + Oxycodone + Smoker + MotionSicknessF + ## SnakeConsumed1hr + PONVChild:MotionSicknessChild## ## Df Deviance AIC LRT Pr(>Chi) ## - MotionSicknessF 1 100.848 181.18 0.8715 0.3505339 ## - Oxycodone 1 101.003 181.34 1.0266 0.3109506 ## - Sex 1 101.496 181.83 1.5191 0.2177527 ## - Smoker 1 101.640 181.98 1.6639 0.1970747 ## <none> 99.976 182.31 ## - PONVChild:MotionSicknessChild 1 102.371 182.71 2.3943 0.1217803 ## - SnakeConsumed1hr 4 114.249 188.58 14.2722 0.0064750 \*\* ## - BMIPerc 1 114.392 194.73 14.4155 0.0001466 \*\*\*## - Height 1 119.164 199.50 19.1874 1.185e-05 \*\*\*## - Weight 1 119.829 200.16 19.8529 8.364e-06 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=181.18## VomitTotalCount ~ Sex + Weight + Height + BMIPerc + PONVChild + ## MotionSicknessChild + Oxycodone + Smoker + SnakeConsumed1hr + ## PONVChild:MotionSicknessChild## ## Df Deviance AIC LRT Pr(>Chi) ## - Oxycodone 1 101.87 180.20 1.0205 0.3123980 ## - Smoker 1 102.14 180.47 1.2911 0.2558499 ## - Sex 1 102.24 180.58 1.3963 0.2373433 ## <none> 100.85 181.18 ## - PONVChild:MotionSicknessChild 1 103.27 181.61 2.4246 0.1194406 ## - SnakeConsumed1hr 4 114.49 186.82 13.6378 0.0085453 \*\* ## - BMIPerc 1 115.67 194.01 14.8234 0.0001181 \*\*\*## - Height 1 119.48 197.81 18.6279 1.589e-05 \*\*\*## - Weight 1 120.12 198.46 19.2714 1.134e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=180.2## VomitTotalCount ~ Sex + Weight + Height + BMIPerc + PONVChild + ## MotionSicknessChild + Smoker + SnakeConsumed1hr + PONVChild:MotionSicknessChild## ## Df Deviance AIC LRT Pr(>Chi) ## - Smoker 1 103.04 179.38 1.1739 0.2785928 ## - Sex 1 103.48 179.82 1.6130 0.2040679 ## <none> 101.87 180.20 ## - PONVChild:MotionSicknessChild 1 104.25 180.59 2.3816 0.1227689 ## - SnakeConsumed1hr 4 117.57 187.91 15.7052 0.0034414 \*\* ## - BMIPerc 1 116.03 192.37 14.1648 0.0001675 \*\*\*## - Height 1 119.72 196.06 17.8551 2.384e-05 \*\*\*## - Weight 1 120.55 196.89 18.6830 1.544e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=179.38## VomitTotalCount ~ Sex + Weight + Height + BMIPerc + PONVChild + ## MotionSicknessChild + SnakeConsumed1hr + PONVChild:MotionSicknessChild## ## Df Deviance AIC LRT Pr(>Chi) ## - Sex 1 104.96 179.30 1.9221 0.1656301 ## <none> 103.04 179.38 ## - PONVChild:MotionSicknessChild 1 105.86 180.20 2.8206 0.0930631 . ## - SnakeConsumed1hr 4 119.86 188.19 16.8167 0.0020980 \*\* ## - BMIPerc 1 116.31 190.65 13.2724 0.0002693 \*\*\*## - Height 1 120.40 194.74 17.3608 3.091e-05 \*\*\*## - Weight 1 121.47 195.81 18.4302 1.762e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=179.3## VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + MotionSicknessChild + ## SnakeConsumed1hr + PONVChild:MotionSicknessChild## ## Df Deviance AIC LRT Pr(>Chi) ## <none> 104.96 179.30 ## - PONVChild:MotionSicknessChild 1 107.16 179.49 2.1908 0.1388340 ## - SnakeConsumed1hr 4 121.05 187.39 16.0859 0.0029061 \*\* ## - BMIPerc 1 118.24 190.58 13.2764 0.0002688 \*\*\*## - Height 1 120.91 193.25 15.9500 6.504e-05 \*\*\*## - Weight 1 122.22 194.56 17.2570 3.265e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

## ## Call: glm(formula = VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + ## MotionSicknessChild + SnakeConsumed1hr + PONVChild:MotionSicknessChild, ## family = poisson(link = log), data = Sdata)## ## Coefficients:## (Intercept) Weight ## -12.1354 -0.1831 ## Height BMIPerc ## 0.1093 0.0336 ## PONVChildYes MotionSicknessChildYes ## 0.7516 0.2296 ## SnakeConsumed1hr10-20cm SnakeConsumed1hr20-30cm ## 0.3822 0.9879 ## SnakeConsumed1hr30-40cm SnakeConsumed1hrNotconsumed ## -0.5244 1.2092 ## PONVChildYes:MotionSicknessChildYes ## 2.1139 ## ## Degrees of Freedom: 129 Total (i.e. Null); 119 Residual## (149 observations deleted due to missingness)## Null Deviance: 142.7 ## Residual Deviance: 105 AIC: 179.3

Sdata.glma = **glm**(VomitTotalCount**~** Age **+** Sex **+** Weight **+** Height **+** BMI **+** BMIPerc **+** PONVChild**+**MotionSicknessChild **+** PONVFamily**\***MotionSicknessF**+**Oxycodone **+**Smoker **+** Morphine **+** SnakeConsumed1hr, data=Sdata, family ="poisson"(link=log))**step**(Sdata.glma, test="LRT")

## Start: AIC=191.12## VomitTotalCount ~ Age + Sex + Weight + Height + BMI + BMIPerc + ## PONVChild + MotionSicknessChild + PONVFamily \* MotionSicknessF + ## Oxycodone + Smoker + Morphine + SnakeConsumed1hr## ## Df Deviance AIC LRT Pr(>Chi) ## - Morphine 1 100.80 189.13 0.0123 0.911720 ## - Age 1 100.90 189.24 0.1158 0.733613 ## - PONVFamily:MotionSicknessF 1 101.57 189.91 0.7899 0.374135 ## - BMI 1 101.58 189.91 0.7951 0.372551 ## - Sex 1 101.86 190.20 1.0767 0.299432 ## - Oxycodone 1 102.28 190.61 1.4931 0.221738 ## - MotionSicknessChild 1 102.74 191.07 1.9554 0.162011 ## <none> 100.78 191.12 ## - Smoker 1 102.87 191.21 2.0859 0.148663 ## - PONVChild 1 104.13 192.46 3.3447 0.067420 . ## - BMIPerc 1 105.13 193.47 4.3468 0.037078 \* ## - Weight 1 105.48 193.82 4.6993 0.030176 \* ## - Height 1 108.01 196.35 7.2293 0.007172 \*\*## - SnakeConsumed1hr 4 117.04 199.38 16.2579 0.002692 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=189.13## VomitTotalCount ~ Age + Sex + Weight + Height + BMI + BMIPerc + ## PONVChild + MotionSicknessChild + PONVFamily + MotionSicknessF + ## Oxycodone + Smoker + SnakeConsumed1hr + PONVFamily:MotionSicknessF## ## Df Deviance AIC LRT Pr(>Chi) ## - Age 1 100.91 187.24 0.1112 0.738726 ## - BMI 1 101.59 187.92 0.7910 0.373793 ## - PONVFamily:MotionSicknessF 1 101.60 187.94 0.8047 0.369689 ## - Sex 1 101.86 188.20 1.0649 0.302093 ## - Oxycodone 1 102.30 188.64 1.5075 0.219521 ## - MotionSicknessChild 1 102.76 189.10 1.9672 0.160747 ## <none> 100.80 189.13 ## - Smoker 1 102.95 189.29 2.1590 0.141740 ## - PONVChild 1 104.14 190.47 3.3436 0.067468 . ## - BMIPerc 1 105.13 191.47 4.3366 0.037302 \* ## - Weight 1 105.50 191.83 4.6992 0.030176 \* ## - Height 1 108.06 194.40 7.2686 0.007017 \*\*## - SnakeConsumed1hr 4 117.30 197.64 16.5055 0.002411 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=187.24## VomitTotalCount ~ Sex + Weight + Height + BMI + BMIPerc + PONVChild + ## MotionSicknessChild + PONVFamily + MotionSicknessF + Oxycodone + ## Smoker + SnakeConsumed1hr + PONVFamily:MotionSicknessF## ## Df Deviance AIC LRT Pr(>Chi) ## - PONVFamily:MotionSicknessF 1 101.67 186.01 0.7678 0.380913 ## - BMI 1 101.74 186.07 0.8302 0.362228 ## - Sex 1 101.94 186.27 1.0281 0.310610 ## - Oxycodone 1 102.44 186.78 1.5367 0.215113 ## - MotionSicknessChild 1 102.82 187.15 1.9093 0.167042 ## <none> 100.91 187.24 ## - Smoker 1 103.00 187.34 2.0938 0.147893 ## - PONVChild 1 104.14 188.48 3.2344 0.072105 . ## - BMIPerc 1 105.76 190.09 4.8500 0.027646 \* ## - Weight 1 105.95 190.29 5.0442 0.024708 \* ## - Height 1 108.47 192.81 7.5643 0.005954 \*\*## - SnakeConsumed1hr 4 117.39 195.72 16.4780 0.002440 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=186.01## VomitTotalCount ~ Sex + Weight + Height + BMI + BMIPerc + PONVChild + ## MotionSicknessChild + PONVFamily + MotionSicknessF + Oxycodone + ## Smoker + SnakeConsumed1hr## ## Df Deviance AIC LRT Pr(>Chi) ## - PONVFamily 1 101.68 184.01 0.0011 0.973233 ## - BMI 1 102.37 184.71 0.6958 0.404210 ## - Sex 1 102.48 184.82 0.8099 0.368148 ## - MotionSicknessF 1 102.55 184.89 0.8793 0.348396 ## - Oxycodone 1 102.69 185.02 1.0119 0.314454 ## <none> 101.67 186.01 ## - MotionSicknessChild 1 103.91 186.25 2.2361 0.134822 ## - Smoker 1 103.95 186.28 2.2731 0.131634 ## - PONVChild 1 105.99 188.33 4.3151 0.037775 \* ## - Weight 1 106.47 188.80 4.7903 0.028621 \* ## - BMIPerc 1 106.95 189.29 5.2769 0.021610 \* ## - Height 1 108.84 191.18 7.1668 0.007427 \*\*## - SnakeConsumed1hr 4 117.54 193.88 15.8646 0.003206 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=184.01## VomitTotalCount ~ Sex + Weight + Height + BMI + BMIPerc + PONVChild + ## MotionSicknessChild + MotionSicknessF + Oxycodone + Smoker + ## SnakeConsumed1hr## ## Df Deviance AIC LRT Pr(>Chi) ## - BMI 1 102.37 182.71 0.6947 0.404563 ## - Sex 1 102.54 182.88 0.8648 0.352394 ## - MotionSicknessF 1 102.56 182.89 0.8820 0.347646 ## - Oxycodone 1 102.72 183.06 1.0489 0.305760 ## <none> 101.68 184.01 ## - MotionSicknessChild 1 103.91 184.25 2.2377 0.134684 ## - Smoker 1 103.97 184.31 2.2989 0.129467 ## - PONVChild 1 106.13 186.47 4.4532 0.034836 \* ## - Weight 1 106.47 186.81 4.7986 0.028483 \* ## - BMIPerc 1 107.15 187.49 5.4773 0.019266 \* ## - Height 1 108.90 189.24 7.2281 0.007177 \*\*## - SnakeConsumed1hr 4 117.77 192.10 16.0897 0.002901 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=182.71## VomitTotalCount ~ Sex + Weight + Height + BMIPerc + PONVChild + ## MotionSicknessChild + MotionSicknessF + Oxycodone + Smoker + ## SnakeConsumed1hr## ## Df Deviance AIC LRT Pr(>Chi) ## - MotionSicknessF 1 103.27 181.61 0.9019 0.3422750 ## - Sex 1 103.31 181.64 0.9366 0.3331592 ## - Oxycodone 1 103.35 181.69 0.9812 0.3219064 ## <none> 102.37 182.71 ## - Smoker 1 104.58 182.92 2.2132 0.1368377 ## - MotionSicknessChild 1 104.79 183.12 2.4164 0.1200689 ## - PONVChild 1 106.47 184.81 4.1015 0.0428444 \* ## - SnakeConsumed1hr 4 118.41 190.74 16.0377 0.0029689 \*\* ## - BMIPerc 1 114.56 192.89 12.1873 0.0004812 \*\*\*## - Height 1 119.27 197.60 16.8945 3.952e-05 \*\*\*## - Weight 1 119.86 198.20 17.4933 2.883e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=181.61## VomitTotalCount ~ Sex + Weight + Height + BMIPerc + PONVChild + ## MotionSicknessChild + Oxycodone + Smoker + SnakeConsumed1hr## ## Df Deviance AIC LRT Pr(>Chi) ## - Sex 1 104.16 180.50 0.8888 0.3458141 ## - Oxycodone 1 104.25 180.59 0.9775 0.3228155 ## - Smoker 1 105.02 181.36 1.7504 0.1858285 ## <none> 103.27 181.61 ## - MotionSicknessChild 1 105.39 181.72 2.1145 0.1459074 ## - PONVChild 1 107.60 183.94 4.3278 0.0374943 \* ## - SnakeConsumed1hr 4 118.52 188.85 15.2442 0.0042206 \*\* ## - BMIPerc 1 115.87 192.20 12.5930 0.0003872 \*\*\*## - Height 1 119.62 195.95 16.3448 5.28e-05 \*\*\*## - Weight 1 120.18 196.51 16.9047 3.93e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=180.5## VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + MotionSicknessChild + ## Oxycodone + Smoker + SnakeConsumed1hr## ## Df Deviance AIC LRT Pr(>Chi) ## - Oxycodone 1 105.33 179.67 1.1723 0.2789221 ## - MotionSicknessChild 1 105.98 180.31 1.8159 0.1778041 ## - Smoker 1 106.16 180.50 2.0000 0.1573008 ## <none> 104.16 180.50 ## - PONVChild 1 108.52 182.85 4.3563 0.0368721 \* ## - SnakeConsumed1hr 4 119.39 187.73 15.2325 0.0042426 \*\* ## - BMIPerc 1 117.36 191.69 13.1974 0.0002803 \*\*\*## - Height 1 119.90 194.23 15.7342 7.289e-05 \*\*\*## - Weight 1 120.65 194.98 16.4863 4.900e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=179.67## VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + MotionSicknessChild + ## Smoker + SnakeConsumed1hr## ## Df Deviance AIC LRT Pr(>Chi) ## - MotionSicknessChild 1 106.76 179.10 1.4300 0.2317639 ## - Smoker 1 107.16 179.49 1.8216 0.1771218 ## <none> 105.33 179.67 ## - PONVChild 1 109.06 181.40 3.7301 0.0534414 . ## - SnakeConsumed1hr 4 122.31 188.64 16.9752 0.0019545 \*\* ## - BMIPerc 1 117.78 190.12 12.4501 0.0004180 \*\*\*## - Height 1 120.21 192.55 14.8773 0.0001147 \*\*\*## - Weight 1 121.16 193.50 15.8293 6.932e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=179.1## VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + Smoker + ## SnakeConsumed1hr## ## Df Deviance AIC LRT Pr(>Chi) ## - Smoker 1 108.70 179.04 1.9404 0.1636213 ## <none> 106.76 179.10 ## - PONVChild 1 110.17 180.51 3.4099 0.0648076 . ## - BMIPerc 1 118.19 188.52 11.4229 0.0007254 \*\*\*## - SnakeConsumed1hr 4 124.72 189.06 17.9608 0.0012560 \*\* ## - Weight 1 122.85 193.19 16.0859 6.053e-05 \*\*\*## - Height 1 123.07 193.40 16.3041 5.395e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=179.04## VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + SnakeConsumed1hr## ## Df Deviance AIC LRT Pr(>Chi) ## <none> 108.70 179.04 ## - PONVChild 1 112.73 181.06 4.0225 0.044896 \* ## - BMIPerc 1 118.75 187.08 10.0419 0.001530 \*\* ## - SnakeConsumed1hr 4 126.79 189.12 18.0815 0.001190 \*\* ## - Weight 1 123.82 192.16 15.1184 0.000101 \*\*\*## - Height 1 123.85 192.19 15.1470 9.946e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

## ## Call: glm(formula = VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + ## SnakeConsumed1hr, family = poisson(link = log), data = Sdata)## ## Coefficients:## (Intercept) Weight ## -11.3498 -0.1740 ## Height BMIPerc ## 0.1043 0.0266 ## PONVChildYes SnakeConsumed1hr10-20cm ## 1.1462 0.8557 ## SnakeConsumed1hr20-30cm SnakeConsumed1hr30-40cm ## 1.1421 -0.4701 ## SnakeConsumed1hrNotconsumed ## 1.2251 ## ## Degrees of Freedom: 129 Total (i.e. Null); 121 Residual## (149 observations deleted due to missingness)## Null Deviance: 142.7 ## Residual Deviance: 108.7 AIC: 179

Sdata.glma = **glm**(VomitTotalCount**~** Age **+** Sex **+** Weight **+** Height **+** BMI **+** BMIPerc **+** PONVChild**+**MotionSicknessChild **+** PONVFamily**+**MotionSicknessF**\***Oxycodone **+**Smoker **+** Morphine **+** SnakeConsumed1hr, data=Sdata, family ="poisson"(link=log))**step**(Sdata.glma, test="LRT")

## Start: AIC=188.21## VomitTotalCount ~ Age + Sex + Weight + Height + BMI + BMIPerc + ## PONVChild + MotionSicknessChild + PONVFamily + MotionSicknessF \* ## Oxycodone + Smoker + Morphine + SnakeConsumed1hr## ## Df Deviance AIC LRT Pr(>Chi) ## - Age 1 97.871 186.21 0.0000 0.999249 ## - Morphine 1 97.933 186.27 0.0615 0.804152 ## - Sex 1 98.093 186.43 0.2221 0.637442 ## - PONVFamily 1 98.206 186.54 0.3347 0.562876 ## - MotionSicknessChild 1 99.059 187.40 1.1882 0.275684 ## - BMI 1 99.119 187.45 1.2477 0.263993 ## <none> 97.871 188.21 ## - Smoker 1 100.709 189.04 2.8382 0.092046 . ## - BMIPerc 1 101.011 189.35 3.1401 0.076388 . ## - MotionSicknessF:Oxycodone 1 101.573 189.91 3.7023 0.054337 . ## - PONVChild 1 102.081 190.42 4.2104 0.040178 \* ## - Weight 1 103.363 191.70 5.4916 0.019108 \* ## - Height 1 104.885 193.22 7.0138 0.008088 \*\*## - SnakeConsumed1hr 4 111.842 194.18 13.9708 0.007389 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=186.21## VomitTotalCount ~ Sex + Weight + Height + BMI + BMIPerc + PONVChild + ## MotionSicknessChild + PONVFamily + MotionSicknessF + Oxycodone + ## Smoker + Morphine + SnakeConsumed1hr + MotionSicknessF:Oxycodone## ## Df Deviance AIC LRT Pr(>Chi) ## - Morphine 1 97.933 184.27 0.0620 0.803345 ## - Sex 1 98.097 184.43 0.2262 0.634342 ## - PONVFamily 1 98.206 184.54 0.3348 0.562859 ## - MotionSicknessChild 1 99.079 185.41 1.2076 0.271813 ## - BMI 1 99.127 185.46 1.2555 0.262503 ## <none> 97.871 186.21 ## - Smoker 1 100.726 187.06 2.8549 0.091098 . ## - BMIPerc 1 101.037 187.37 3.1662 0.075175 . ## - MotionSicknessF:Oxycodone 1 101.656 187.99 3.7846 0.051727 . ## - PONVChild 1 102.284 188.62 4.4130 0.035665 \* ## - Weight 1 103.509 189.84 5.6382 0.017573 \* ## - Height 1 105.677 192.01 7.8058 0.005208 \*\*## - SnakeConsumed1hr 4 112.330 192.66 14.4587 0.005966 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=184.27## VomitTotalCount ~ Sex + Weight + Height + BMI + BMIPerc + PONVChild + ## MotionSicknessChild + PONVFamily + MotionSicknessF + Oxycodone + ## Smoker + SnakeConsumed1hr + MotionSicknessF:Oxycodone## ## Df Deviance AIC LRT Pr(>Chi) ## - Sex 1 98.150 182.49 0.2166 0.641672 ## - PONVFamily 1 98.284 182.62 0.3507 0.553696 ## - MotionSicknessChild 1 99.104 183.44 1.1705 0.279291 ## - BMI 1 99.149 183.48 1.2156 0.270230 ## <none> 97.933 184.27 ## - Smoker 1 100.736 185.07 2.8030 0.094087 . ## - BMIPerc 1 101.063 185.40 3.1295 0.076889 . ## - MotionSicknessF:Oxycodone 1 101.675 186.01 3.7417 0.053070 . ## - PONVChild 1 102.284 186.62 4.3510 0.036987 \* ## - Weight 1 103.516 187.85 5.5827 0.018138 \* ## - Height 1 105.793 190.13 7.8599 0.005054 \*\*## - SnakeConsumed1hr 4 112.683 191.02 14.7502 0.005248 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=182.49## VomitTotalCount ~ Weight + Height + BMI + BMIPerc + PONVChild + ## MotionSicknessChild + PONVFamily + MotionSicknessF + Oxycodone + ## Smoker + SnakeConsumed1hr + MotionSicknessF:Oxycodone## ## Df Deviance AIC LRT Pr(>Chi) ## - PONVFamily 1 98.713 181.05 0.5635 0.452845 ## - MotionSicknessChild 1 99.192 181.53 1.0426 0.307211 ## - BMI 1 99.514 181.85 1.3640 0.242838 ## <none> 98.150 182.49 ## - BMIPerc 1 101.171 183.51 3.0213 0.082178 . ## - Smoker 1 101.189 183.52 3.0389 0.081289 . ## - MotionSicknessF:Oxycodone 1 102.485 184.82 4.3351 0.037335 \* ## - PONVChild 1 102.504 184.84 4.3539 0.036925 \* ## - Weight 1 104.122 186.46 5.9723 0.014532 \* ## - Height 1 106.348 188.68 8.1985 0.004193 \*\*## - SnakeConsumed1hr 4 112.838 189.17 14.6888 0.005392 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=181.05## VomitTotalCount ~ Weight + Height + BMI + BMIPerc + PONVChild + ## MotionSicknessChild + MotionSicknessF + Oxycodone + Smoker + ## SnakeConsumed1hr + MotionSicknessF:Oxycodone## ## Df Deviance AIC LRT Pr(>Chi) ## - MotionSicknessChild 1 99.709 180.04 0.9958 0.318319 ## - BMI 1 99.902 180.24 1.1884 0.275658 ## <none> 98.713 181.05 ## - Smoker 1 102.080 182.41 3.3664 0.066538 . ## - MotionSicknessF:Oxycodone 1 102.541 182.88 3.8276 0.050415 . ## - BMIPerc 1 102.693 183.03 3.9794 0.046061 \* ## - PONVChild 1 103.515 183.85 4.8020 0.028427 \* ## - Weight 1 104.511 184.85 5.7978 0.016047 \* ## - Height 1 106.897 187.23 8.1839 0.004226 \*\*## - SnakeConsumed1hr 4 114.173 188.51 15.4595 0.003837 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=180.04## VomitTotalCount ~ Weight + Height + BMI + BMIPerc + PONVChild + ## MotionSicknessF + Oxycodone + Smoker + SnakeConsumed1hr + ## MotionSicknessF:Oxycodone## ## Df Deviance AIC LRT Pr(>Chi) ## - BMI 1 101.246 179.58 1.5365 0.215141 ## <none> 99.709 180.04 ## - BMIPerc 1 102.961 181.30 3.2520 0.071337 . ## - Smoker 1 103.138 181.47 3.4292 0.064053 . ## - PONVChild 1 104.342 182.68 4.6328 0.031367 \* ## - MotionSicknessF:Oxycodone 1 104.477 182.81 4.7684 0.028987 \* ## - Weight 1 106.471 184.81 6.7616 0.009314 \*\*## - Height 1 109.400 187.74 9.6905 0.001852 \*\*## - SnakeConsumed1hr 4 116.527 188.86 16.8183 0.002097 \*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## Step: AIC=179.58## VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + MotionSicknessF + ## Oxycodone + Smoker + SnakeConsumed1hr + MotionSicknessF:Oxycodone## ## Df Deviance AIC LRT Pr(>Chi) ## <none> 101.25 179.58 ## - Smoker 1 104.51 180.85 3.2686 0.070618 . ## - PONVChild 1 105.14 181.48 3.8953 0.048423 \* ## - MotionSicknessF:Oxycodone 1 105.38 181.72 4.1357 0.041987 \* ## - BMIPerc 1 111.38 187.71 10.1305 0.001458 \*\* ## - SnakeConsumed1hr 4 117.67 188.00 16.4242 0.002500 \*\* ## - Weight 1 118.08 194.42 16.8385 4.070e-05 \*\*\*## - Height 1 118.33 194.66 17.0802 3.583e-05 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

## ## Call: glm(formula = VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + ## MotionSicknessF + Oxycodone + Smoker + SnakeConsumed1hr + ## MotionSicknessF:Oxycodone, family = poisson(link = log), ## data = Sdata)## ## Coefficients:## (Intercept) Weight ## -11.86048 -0.19294 ## Height BMIPerc ## 0.11688 0.02725 ## PONVChildYes MotionSicknessFYes ## 1.14756 -1.91753 ## OxycodoneYes SmokerYes ## -0.88561 -0.85186 ## SnakeConsumed1hr10-20cm SnakeConsumed1hr20-30cm ## 1.37483 1.46841 ## SnakeConsumed1hr30-40cm SnakeConsumed1hrNotconsumed ## -0.05717 1.46895 ## MotionSicknessFYes:OxycodoneYes ## 2.04697 ## ## Degrees of Freedom: 129 Total (i.e. Null); 117 Residual## (149 observations deleted due to missingness)## Null Deviance: 142.7 ## Residual Deviance: 101.2 AIC: 179.6

Sdata.glmb = **glm**(VomitTotalCount**~** Weight **+** Height **+** BMIPerc **+** PONVChild**+**MotionSicknessF**\***Oxycodone **+**Smoker**+** SnakeConsumed1hr, data=Sdata, family ="poisson"(link=log))**summary**(Sdata.glmb)

## ## Call:## glm(formula = VomitTotalCount ~ Weight + Height + BMIPerc + PONVChild + ## MotionSicknessF \* Oxycodone + Smoker + SnakeConsumed1hr, ## family = poisson(link = log), data = Sdata)## ## Deviance Residuals: ## Min 1Q Median 3Q Max ## -1.6472 -0.6726 -0.4454 -0.1872 2.4591 ## ## Coefficients:## Estimate Std. Error z value Pr(>|z|) ## (Intercept) -11.860485 3.080094 -3.851 0.000118 \*\*\*## Weight -0.192942 0.058787 -3.282 0.001031 \*\* ## Height 0.116878 0.032376 3.610 0.000306 \*\*\*## BMIPerc 0.027250 0.009086 2.999 0.002708 \*\* ## PONVChildYes 1.147564 0.523877 2.191 0.028486 \* ## MotionSicknessFYes -1.917528 1.092308 -1.755 0.079177 . ## OxycodoneYes -0.885612 0.497030 -1.782 0.074780 . ## SmokerYes -0.851856 0.506275 -1.683 0.092454 . ## SnakeConsumed1hr10-20cm 1.374829 0.738058 1.863 0.062495 . ## SnakeConsumed1hr20-30cm 1.468406 0.710283 2.067 0.038701 \* ## SnakeConsumed1hr30-40cm -0.057172 0.597596 -0.096 0.923782 ## SnakeConsumed1hrNotconsumed 1.468952 0.637257 2.305 0.021160 \* ## MotionSicknessFYes:OxycodoneYes 2.046968 1.170538 1.749 0.080336 . ## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## (Dispersion parameter for poisson family taken to be 1)## ## Null deviance: 142.72 on 129 degrees of freedom## Residual deviance: 101.25 on 117 degrees of freedom## (149 observations deleted due to missingness)## AIC: 179.58## ## Number of Fisher Scoring iterations: 6

**summary**(Sdata.glm.new)

## ## Call:## glm(formula = VomitTotalCount ~ PONVChild + BMIPerc + SnakeConsumed1hr + ## Weight + Height, family = poisson(link = log), data = Sdata)## ## Deviance Residuals: ## Min 1Q Median 3Q Max ## -1.6618 -0.7217 -0.4896 -0.2294 3.3180 ## ## Coefficients:## Estimate Std. Error z value Pr(>|z|) ## (Intercept) -11.34981 2.93681 -3.865 0.000111 \*\*\*## PONVChildYes 1.14617 0.50980 2.248 0.024560 \* ## BMIPerc 0.02660 0.00889 2.993 0.002765 \*\* ## SnakeConsumed1hr10-20cm 0.85566 0.64262 1.332 0.183020 ## SnakeConsumed1hr20-30cm 1.14209 0.59688 1.913 0.055691 . ## SnakeConsumed1hr30-40cm -0.47013 0.55641 -0.845 0.398145 ## SnakeConsumed1hrNotconsumed 1.22514 0.60652 2.020 0.043389 \* ## Weight -0.17396 0.05624 -3.093 0.001978 \*\* ## Height 0.10428 0.03065 3.402 0.000669 \*\*\*## ---## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1## ## (Dispersion parameter for poisson family taken to be 1)## ## Null deviance: 142.72 on 129 degrees of freedom## Residual deviance: 108.70 on 121 degrees of freedom## (149 observations deleted due to missingness)## AIC: 179.04## ## Number of Fisher Scoring iterations: 6

**pchisq**(**deviance**(Sdata.glm.new), df=**df.residual**(Sdata.glm.new), lower.tail = FALSE)

## [1] 0.7810206

**pchisq**(**deviance**(Sdata.glmb), df=**df.residual**(Sdata.glmb), lower.tail = FALSE)

## [1] 0.8499056

The null hypothesis is that our model is correctly specified, and we have strong evidence to reject that hypothesis. So we have strong evidence that our model fits badly.

vars.se = **sqrt**(**diag**(**vcov**(Sdata.glm.new)))**\***1.96vars.ci.LL = **coef**(Sdata.glm.new) **-** vars.sevars.ci.UL = **coef**(Sdata.glm.new) **+** vars.se**cbind**(vars.ci.LL,vars.ci.UL)

Figure 2

Text

Description automatically generated

**plot**(**fitted**(Sdata.glm.new), **residuals**(Sdata.glm.new,"pearson"))

Chart, scatter chart

Description automatically generatedFigure 3