Logistic regression AQI data

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Insurance status predicts antiemetic use

We investigate the Hypothesis that insurance status predicets antiemetic use the population in the Public Use File of the Anestehsia Quality Institute with electronic anesthesia records recording antiemetic use.

Load cleaned dataset *myAQI_4_14.Rdata*

we load the cleaned dataset *myAQI_4_14.Rdata*, which we generated in *import_AQI_14Jul2015.Rmd*

```
rm(list = ls())
load("Analysis/Data/fullAQI_4_14.Rdata")
str(fullAQI_4_14)
```

```
## 'data.frame':    173133 obs. of  12 variables:
##  $ ondansetron            : Factor w/ 2 levels "no Ondan","Ondan": 2 1 2 1 1 2 2 2 1 2 ...
##  $ dexamethason           : Factor w/ 2 levels "no Dex","Dex": 1 1 1 1 1 1 1 1 1 1 ...
##  $ droperidol             : Factor w/ 2 levels "no Drope","Drope": 1 1 1 1 1 1 1 1 1 1 ...
##  $ ondan_dex_either       : Factor w/ 2 levels "neither","either": 2 1 2 1 1 2 2 2 1 2 ...
##  $ Payment                : Factor w/ 4 levels "Commercial","MEDICAID",..: 1 1 1 3 1 3 2 1 3 1 ...
##  $ patient_age            : int  50 53 58 73 64 73 19 27 85 59 ...
##  $ patient_age_group      : Factor w/ 6 levels "1-18","19 - 49",..: 3 3 3 4 3 4 2 2 5 3 ...
##  $ patient_sex            : Factor w/ 2 levels "female","male": 2 2 1 2 2 1 1 1 2 2 ...
##  $ asaps                  : Factor w/ 6 levels "1","2","3","4",..: 2 3 3 2 3 3 2 2 3 2 ...
##  $ case_duration_minutes  : int  59 43 190 56 37 116 93 108 70 93 ...
##  $ primary_anesthesia_type: Factor w/ 7 levels "General","Epidural/Spinal",..: 1 4 1 2 3 1 2 1 1 1 .
##  $ practiceID             : Factor w/ 4 levels "193055","691419",..: 2 2 2 2 2 2 2 2 2 2 ...
```

Logistic Regression

Logistic Model 1

We fit a logistic regression model with the a logit link.

```
formula <- ondansetron ~ Payment +patient_age +patient_sex + asaps +
  case_duration_minutes + primary_anesthesia_type + practiceID

fit_logistic <- glm(formula,
                    family = binomial(link = "logit"), data = fullAQI_4_14)
```

After controlling for age, sex, ASA status, case duration, primary anesthesia type (general v. regional) and practice ID, antiemetic administration is strongly associated with insurance status as a marker of Socioeconomic Status.

```
##
## Call:
## glm(formula = formula, family = binomial(link = "logit"), data = fullAQI_4_14)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -2.3398  -0.7932   0.4935   0.7931   3.0246
##
## Coefficients:
##                                                  Estimate Std. Error
## (Intercept)                                     1.161e+00  2.731e-02
## PaymentMEDICAID                                -2.726e-01  1.771e-02
## PaymentMedicare                                -2.855e-01  1.609e-02
## PaymentSELF                                    -1.438e-01  6.300e-02
## patient_age                                     6.916e-03  3.614e-04
## patient_sexmale                                -3.533e-01  1.237e-02
## asaps2                                         -8.797e-02  2.544e-02
## asaps3                                         -5.925e-01  2.648e-02
## asaps4                                         -2.192e+00  2.959e-02
## asaps5                                         -5.367e+00  2.396e-01
## asaps6                                         -5.497e+00  1.016e+00
## case_duration_minutes                          -5.644e-04  3.775e-05
## primary_anesthesia_typeEpidural/Spinal         -2.239e+00  1.940e-02
## primary_anesthesia_typeRegional                -2.233e+00  5.274e-02
## primary_anesthesia_typeMonitored Anesthesia Care -2.893e+00  2.261e-02
## primary_anesthesia_typeSedation                -4.051e+00  1.057e+00
## primary_anesthesia_typeLocal                   -1.576e+00  1.178e+00
## practiceID691419                                3.819e-01  2.082e-02
## practiceID5013437                               1.050e+00  2.257e-02
## practiceID5610264                               2.178e-01  1.615e-02
##                                                 z value Pr(>|z|)
## (Intercept)                                      42.530  < 2e-16 ***
## PaymentMEDICAID                                 -15.397  < 2e-16 ***
## PaymentMedicare                                 -17.737  < 2e-16 ***
## PaymentSELF                                      -2.283 0.022419 *
## patient_age                                      19.136  < 2e-16 ***
## patient_sexmale                                 -28.562  < 2e-16 ***
## asaps2                                           -3.458 0.000544 ***
## asaps3                                          -22.372  < 2e-16 ***
## asaps4                                          -74.077  < 2e-16 ***
## asaps5                                          -22.399  < 2e-16 ***
## asaps6                                           -5.412 6.22e-08 ***
## case_duration_minutes                           -14.951  < 2e-16 ***
## primary_anesthesia_typeEpidural/Spinal         -115.396  < 2e-16 ***
## primary_anesthesia_typeRegional                 -42.336  < 2e-16 ***
## primary_anesthesia_typeMonitored Anesthesia Care -127.964  < 2e-16 ***
## primary_anesthesia_typeSedation                  -3.832 0.000127 ***
## primary_anesthesia_typeLocal                     -1.337 0.181103
## practiceID691419                                 18.339  < 2e-16 ***
## practiceID5013437                                46.538  < 2e-16 ***
## practiceID5610264                                13.491  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
```

```
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 239665  on 173132  degrees of freedom
## Residual deviance: 181600  on 173113  degrees of freedom
## AIC: 181640
##
## Number of Fisher Scoring iterations: 6
```

	OR	p
(Intercept)	3.194	0.000
PaymentMEDICAID	0.761	0.000
PaymentMedicare	0.752	0.000
PaymentSELF	0.866	0.022
patient_age	1.007	0.000
patient_sexmale	0.702	0.000
asaps2	0.916	0.001
asaps3	0.553	0.000
asaps4	0.112	0.000
asaps5	0.005	0.000
asaps6	0.004	0.000
case_duration_minutes	0.999	0.000
primary_anesthesia_typeEpidural/Spinal	0.107	0.000
primary_anesthesia_typeRegional	0.107	0.000
primary_anesthesia_typeMonitored Anesthesia Care	0.055	0.000
primary_anesthesia_typeSedation	0.017	0.000
primary_anesthesia_typeLocal	0.207	0.181
practiceID691419	1.465	0.000
practiceID5013437	2.859	0.000
practiceID5610264	1.243	0.000