STA 198 Project

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```
-- Attaching core tidyverse packages ----------------------- tidyverse 2.0.0 --
v dplyr     1.1.4      v readr     2.1.5
v forcats   1.0.0      v stringr   1.5.1
v ggplot2   3.5.2      v tibble    3.3.0
v lubridate 1.9.4      v tidyr     1.3.1
v purrr     1.1.0
-- Conflicts ------------------------------------------ tidyverse_conflicts() --
x dplyr::filter() masks stats::filter()
x dplyr::lag()    masks stats::lag()
i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to becom
Rows: 572 Columns: 24
-- Column specification -------------------------------------------------------
Delimiter: ","
dbl (24): ID, cold_ischemia, r_height, r_weight, r_bmi, r_age, r_caucasian, ...

i Use `spec()` to retrieve the full column specification for this data.
i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```
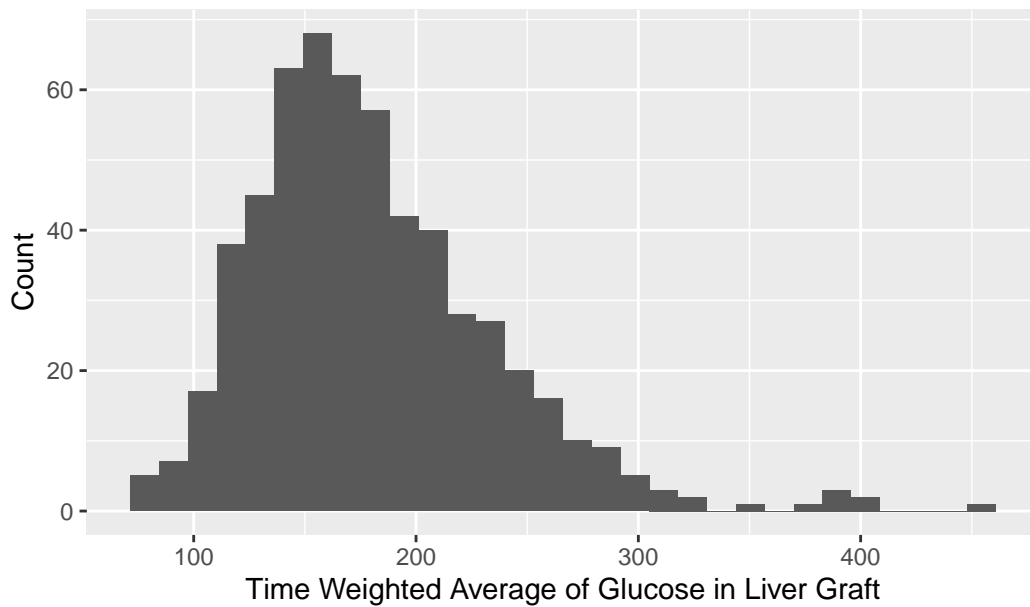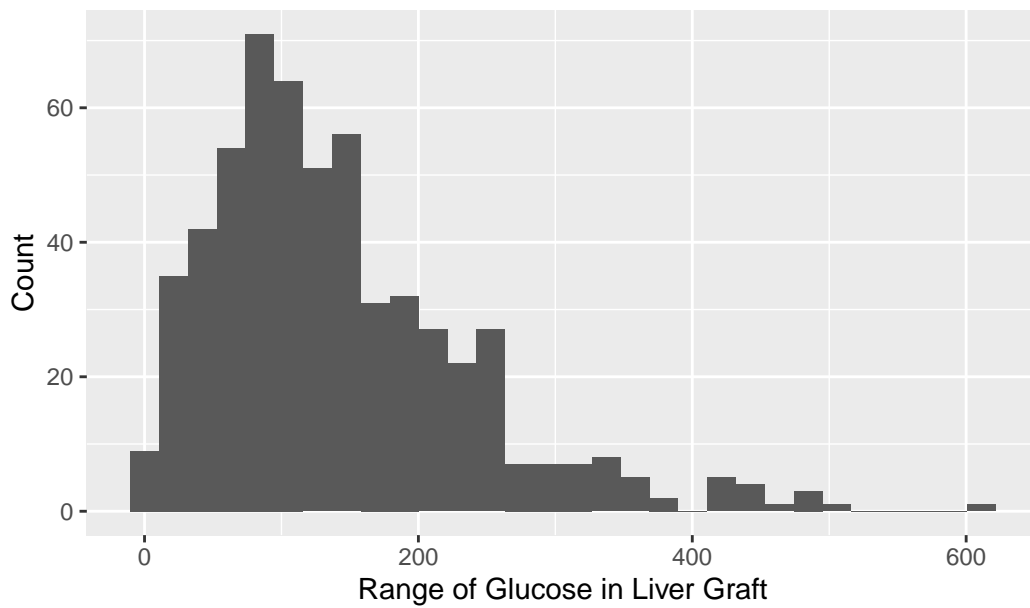
###Exploratory Analysis

```
`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

Distribution of Time Weighted Average of Glucose in Liver Graft

`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

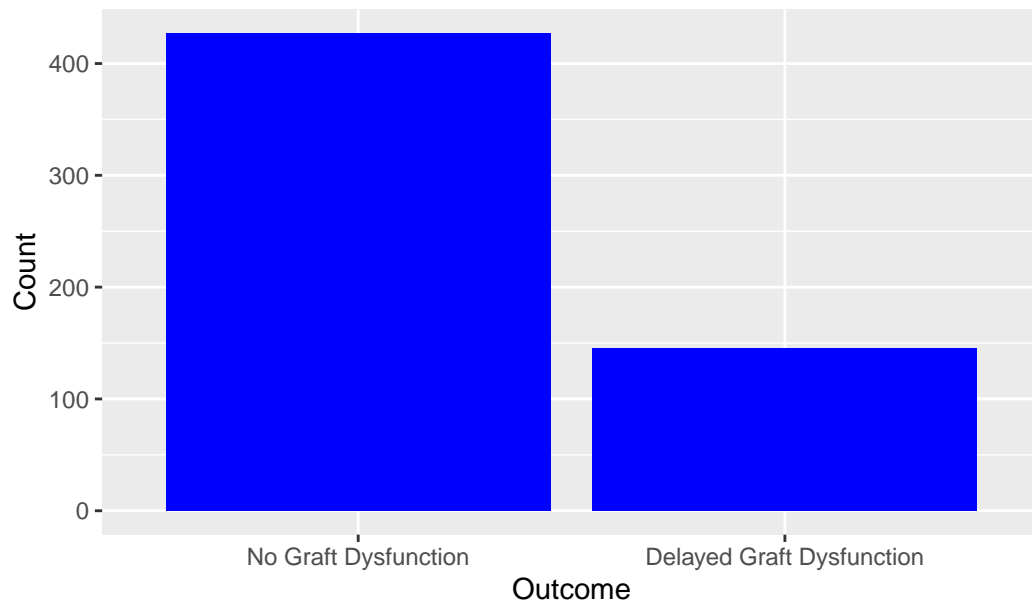## Distribution of Range of Glucose in Liver Graft of Donors

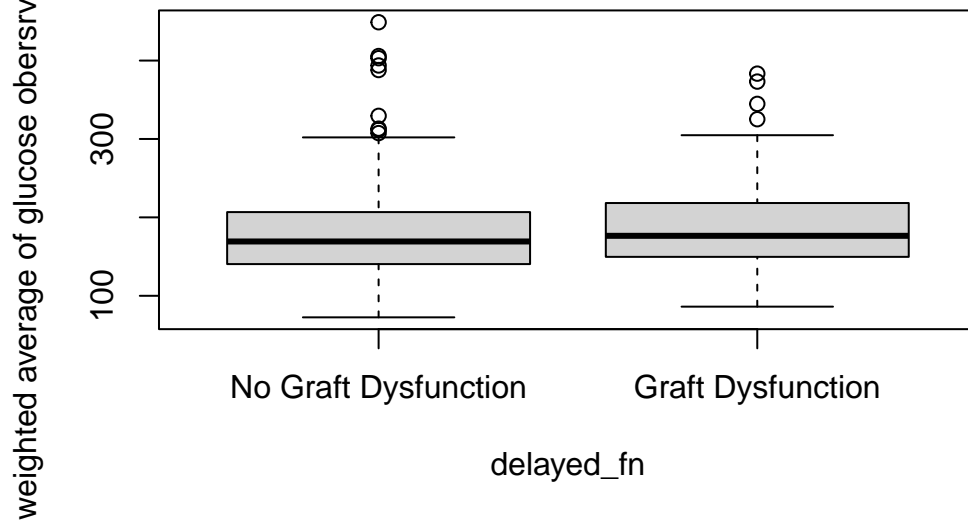`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

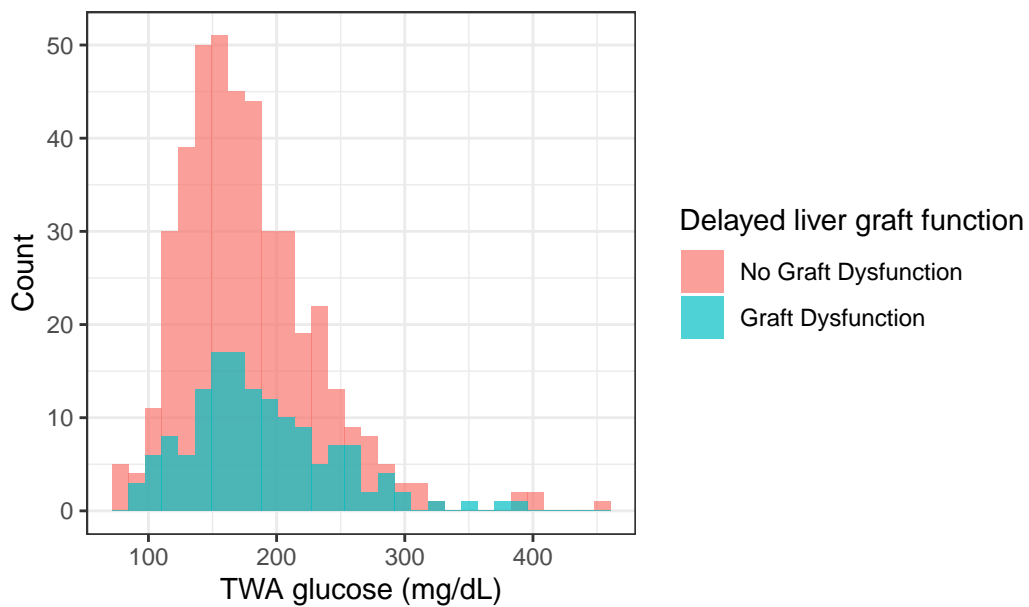## Distribution of Standard Deviations of Glucose in Liver Graft of I

Graft Dysfunction Rate

WA of glucose obersrvations in liver graft vs delayed liver fu

weighted average of glucose obersrvations in li

delayed_fn

Distribution of TWA Glucose by Graft Dysfunction Stat


```
Call:
glm(formula = delayed_fn ~ glutwa, family = binomial, data = data)
```
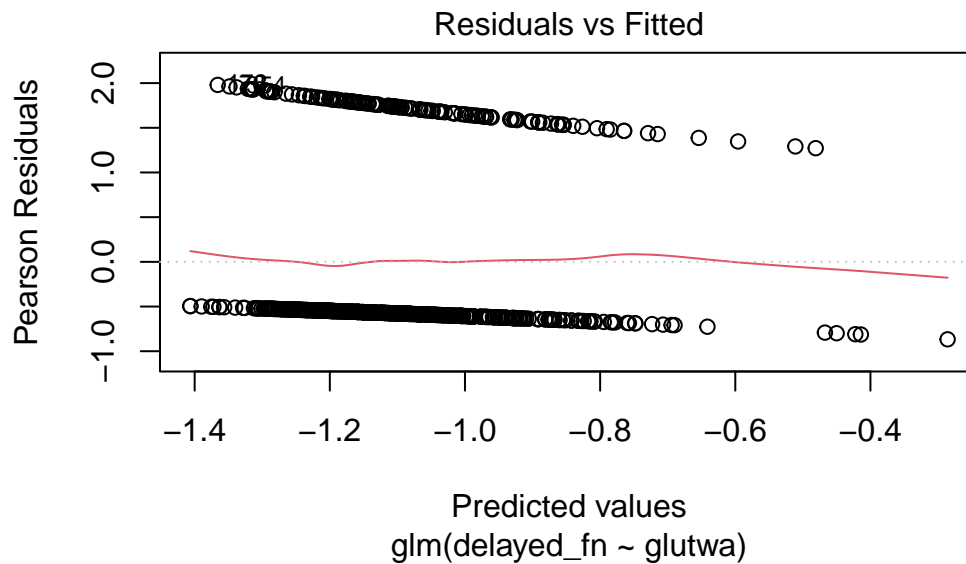
```
Coefficients:
            Estimate Std. Error z value Pr(>|z|)
(Intercept) -1.622352   0.330433   -4.910 9.12e-07 ***
glutwa       0.002978   0.001716    1.735   0.0828 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 647.67  on 571  degrees of freedom
Residual deviance: 644.71  on 570  degrees of freedom
AIC: 648.71

Number of Fisher Scoring iterations: 4
```
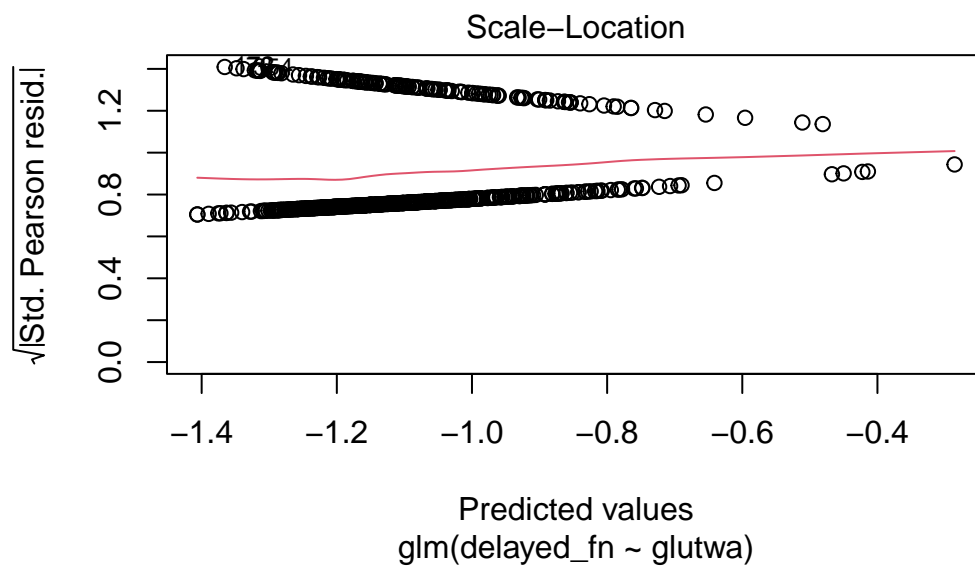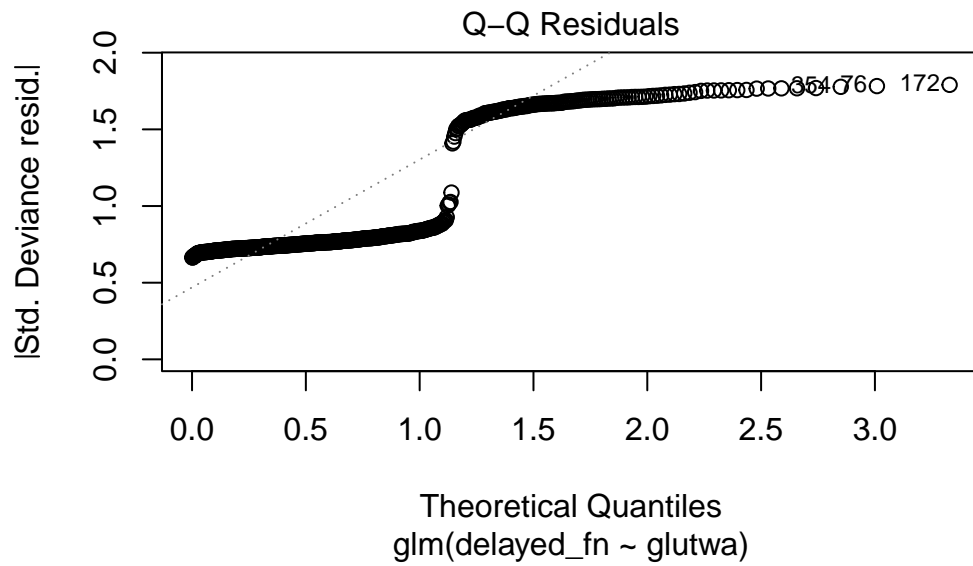

Residuals vs Fitted

Predicted values
glm(delayed_fn ~ glutwa)

Q–Q Residuals

|Std. Deviance resid.|

354 76   172

Theoretical Quantiles
glm(delayed_fn ~ glutwa)

Scale−Location

√|Std. Pearson resid.|

Predicted values
glm(delayed_fn ~ glutwa)

Residuals vs Leverage

glm(delayed_fn ~ glutwa)
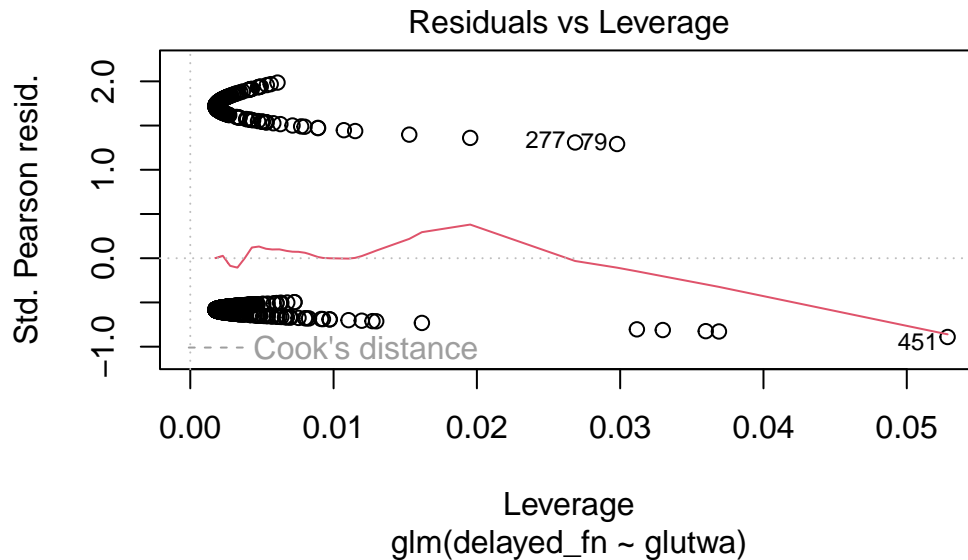
In this logistic regression model, donor time-weighted average glucose (TWA glucose) was not a statistically significant predictor of delayed liver graft dysfunction. The estimated coefficient for glutwa was 0.00298 (SE = 0.00172, p = 0.083), indicating that higher donor glucose levels were associated with slightly higher odds of delayed graft dysfunction. However, this association did not reach conventional levels of statistical significance at alpha = .05. Each 1 mg/dL increase in donor TWA glucose corresponds to an estimated 0.3% increase in the odds of delayed graft dysfunction (OR = exp(0.00298) = 1.003). This effect is very small in magnitude and the p-value suggests that the data do not provide strong evidence of a meaningful relationship.

```
Call:
glm(formula = delayed_fn ~ log2(glutwa) + log2(glurange) + log2(glusd) +
    d_age + r_bmi + r_age + cold_ischemia + sbp_lt_90 + hemo_instability +
    sodium + steatosis + donorrisk, family = binomial(link = "logit"),
    data = data)

Coefficients:
                 Estimate Std. Error z value Pr(>|z|)
(Intercept)    -6.5646627  3.1480876  -2.085   0.0370 *
log2(glutwa)    0.2247601  0.3334197   0.674   0.5002
log2(glurange) -0.7580556  0.3803280  -1.993   0.0462 *
log2(glusd)     0.9598217  0.4266724   2.250   0.0245 *
```

```
d_age                0.0004705  0.0088447   0.053   0.9576
r_bmi               -0.0053308  0.0180825  -0.295   0.7681
r_age               -0.0110063  0.0107671  -1.022   0.3067
cold_ischemia        0.0005974  0.0009309   0.642   0.5211
sbp_lt_90            0.0028556  0.0033344   0.856   0.3918
hemo_instability    -0.1509144  0.3375589  -0.447   0.6548
sodium               0.0182010  0.0149026   1.221   0.2220
steatosis            0.5688802  0.3896539   1.460   0.1443
donorrisk            1.0403755  0.4207527   2.473   0.0134 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 452.33  on 389  degrees of freedom
Residual deviance: 425.38  on 377  degrees of freedom
  (182 observations deleted due to missingness)
AIC: 451.38

Number of Fisher Scoring iterations: 4
```