

# STA 198 Project

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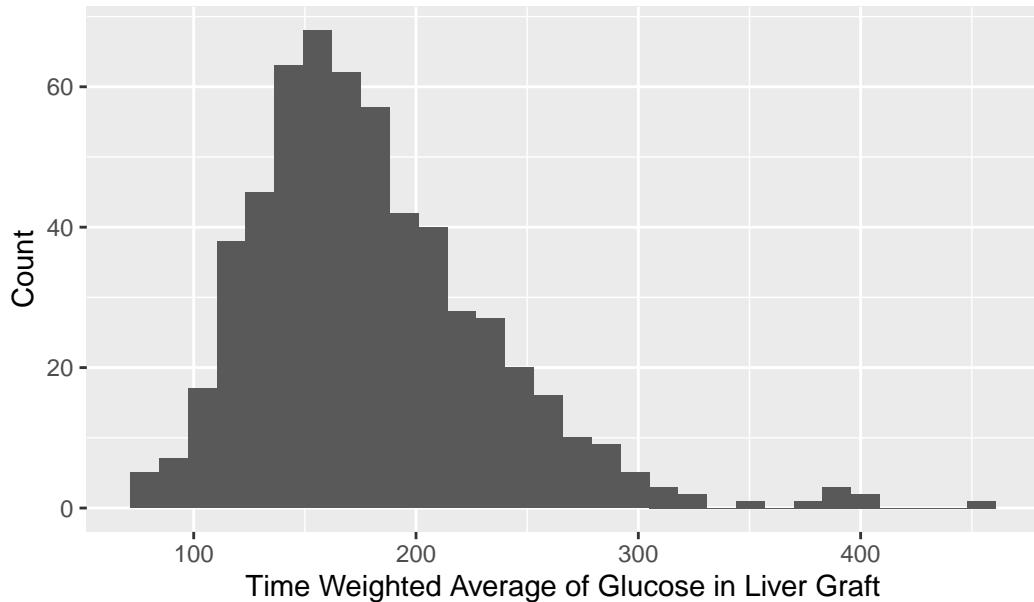
```
-- Attaching core tidyverse packages ----- tidyverse 2.0.0 --
v dplyr     1.1.4     v readr     2.1.5
v forcats   1.0.0     v stringr   1.5.1
v ggplot2   3.5.2     v tibble    3.3.0
v lubridate  1.9.4     v tidyr    1.3.1
v purrr     1.1.0

-- Conflicts -----
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 become non-conflicting.
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
```

Distribution of Time Weighted Average of Glucose in Liver Graft



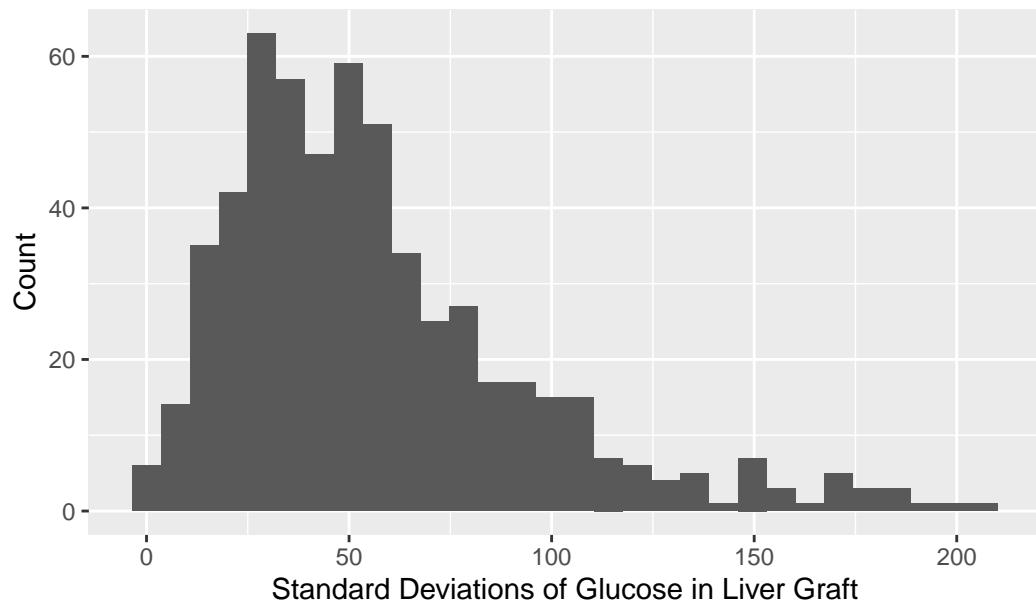
``stat_bin()` using `bins = 30`.` Pick better value with ``binwidth``.

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 |

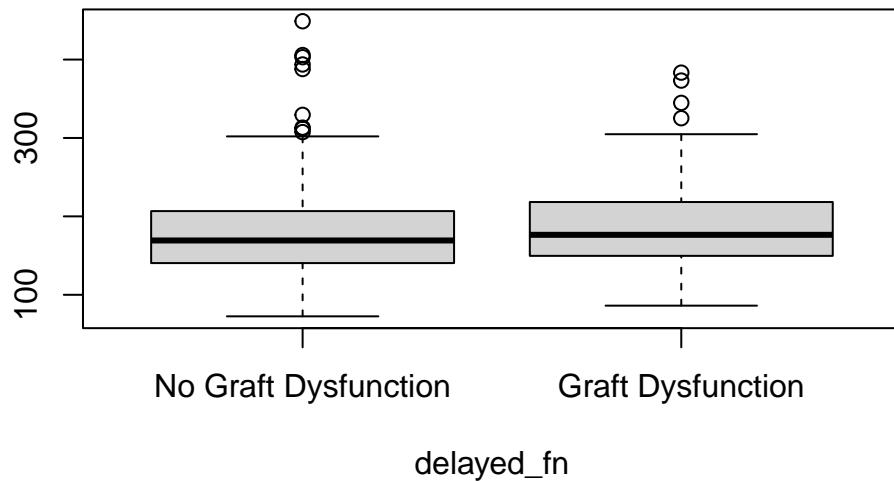


### Graft Dysfunction Rate

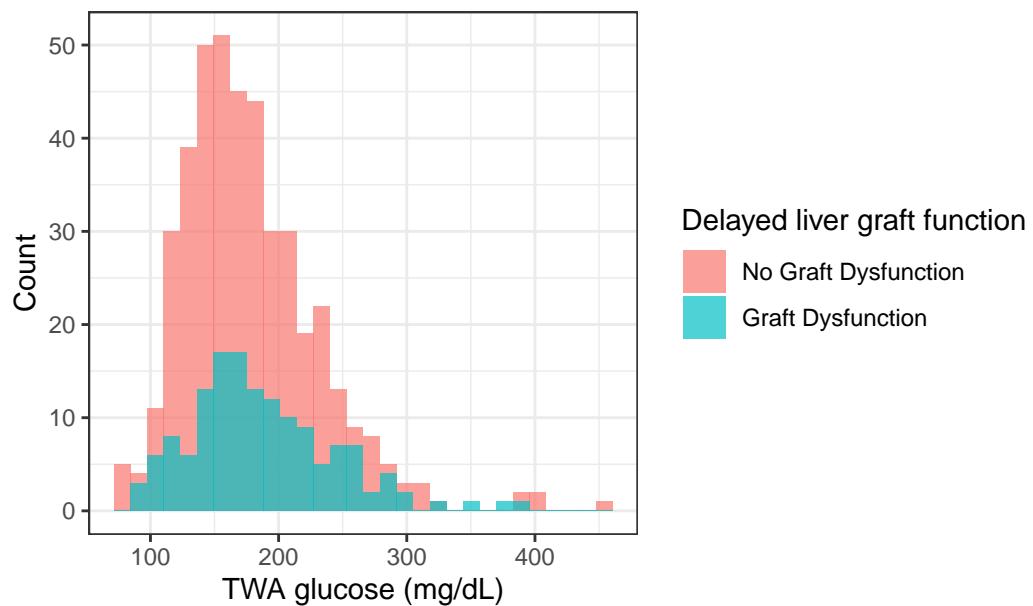


weighted average of glucose observations in liver graft

### TWA of glucose observations in liver graft vs delayed liver function



### Distribution of TWA Glucose by Graft Dysfunction Status



Call:

```
glm(formula = delayed_fn ~ glutwa, family = binomial, data = data)
```

```

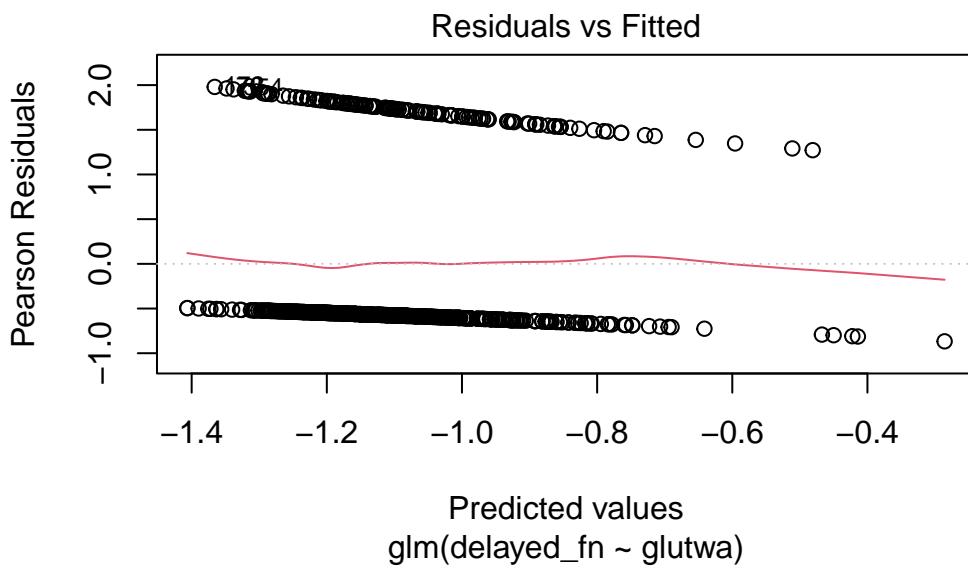
Coefficients:
            Estimate Std. Error z value Pr(>|z|)
(Intercept) -1.622352  0.330433 -4.910 9.12e-07 ***
glutwa       0.002978  0.001716  1.735   0.0828 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

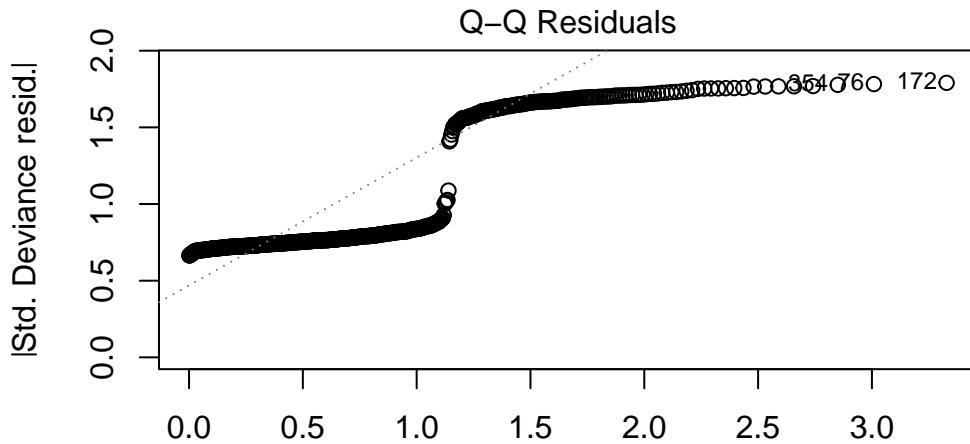
(Dispersion parameter for binomial family taken to be 1)

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

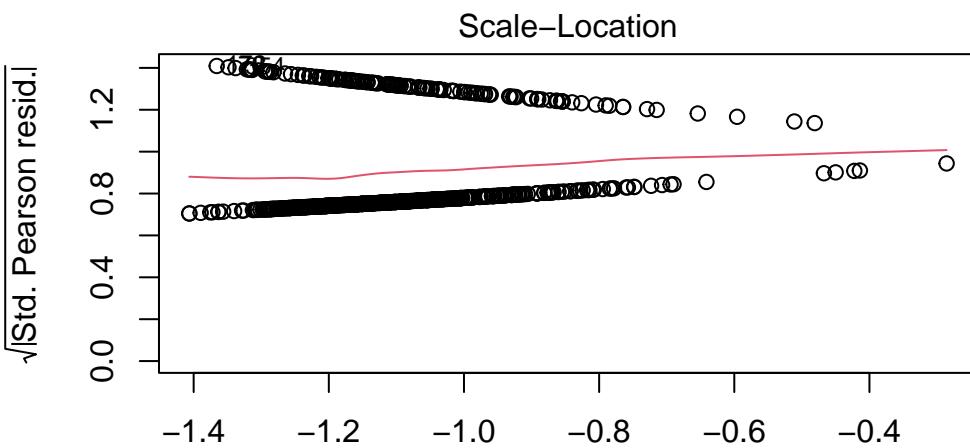
Number of Fisher Scoring iterations: 4

```

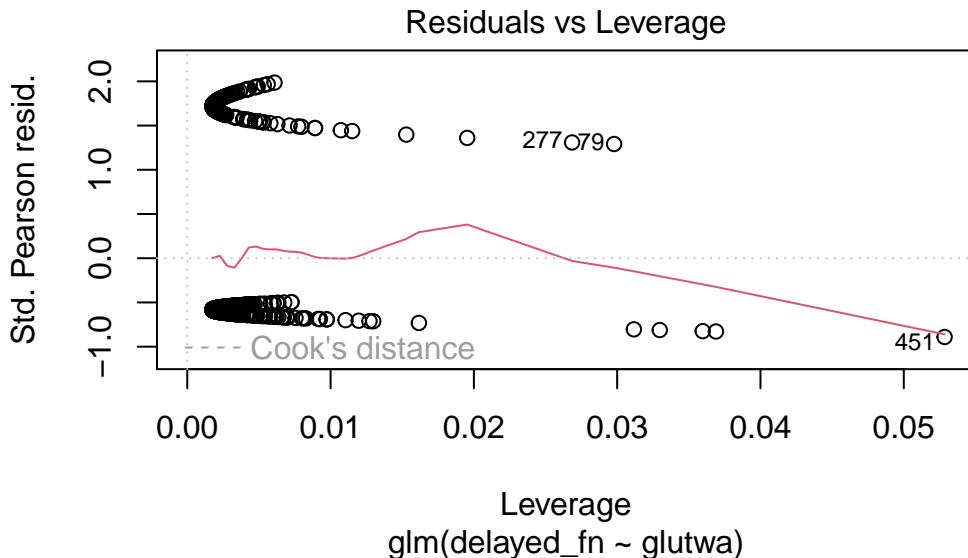




Theoretical Quantiles  
glm(delayed\_fn ~ glutwa)



Predicted values  
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