

STA 198 Project

Julia Zinkin, Sydney Shankman, Christine Lee, Gabrielle Saft

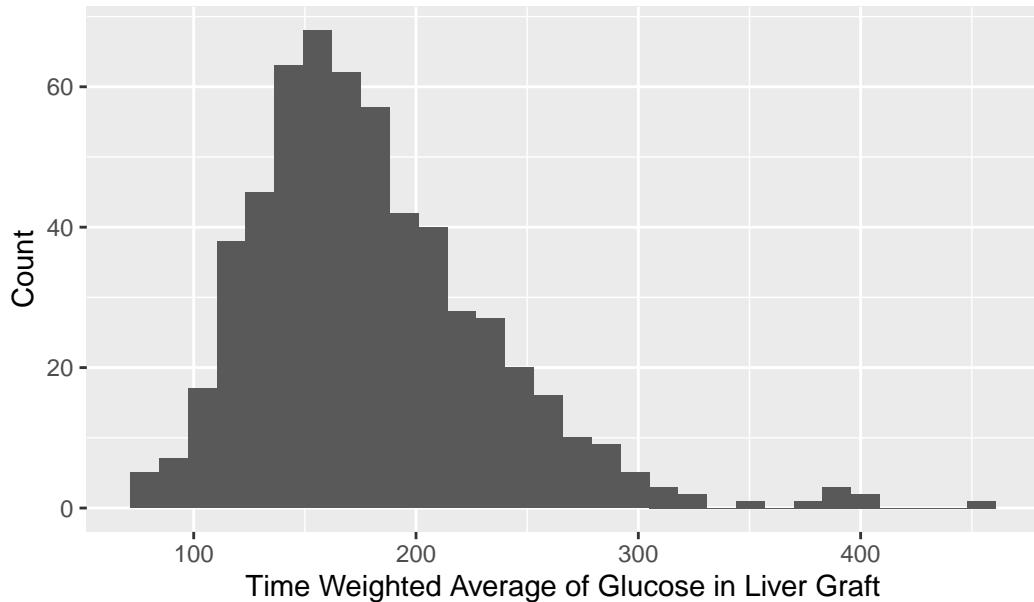
```
-- Attaching core tidyverse packages ----- tidyverse 2.0.0 --
v dplyr     1.1.4     v readr     2.1.5
v forcats   1.0.0     v stringr   1.5.1
v ggplot2   3.5.2     v tibble    3.3.0
v lubridate  1.9.4     v tidyr    1.3.1
v purrr     1.1.0

-- 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.

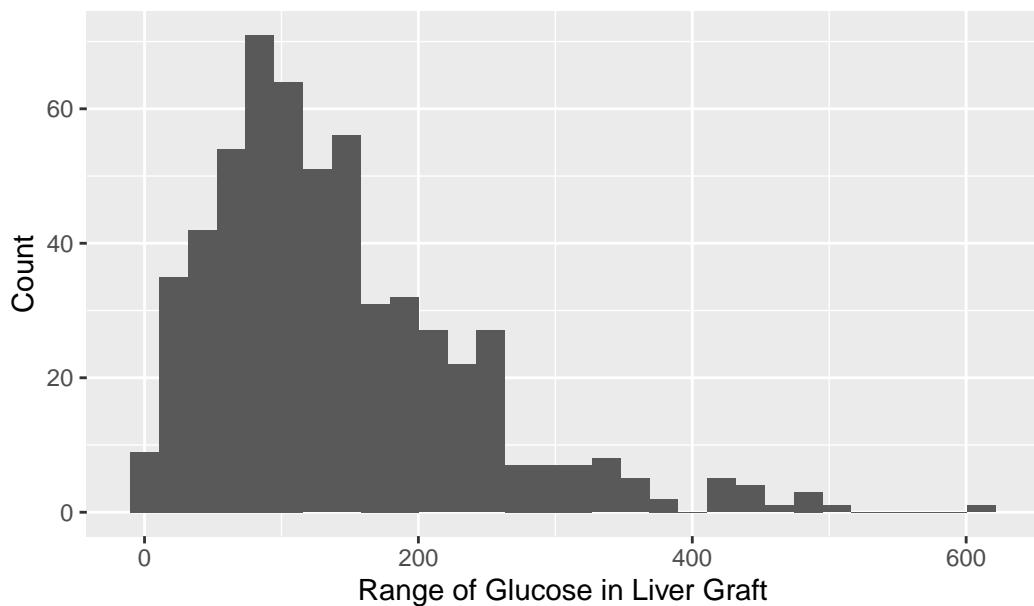
## ## Exploratory Analysis
```

Distribution of Time Weighted Average of Glucose in Liver Graft



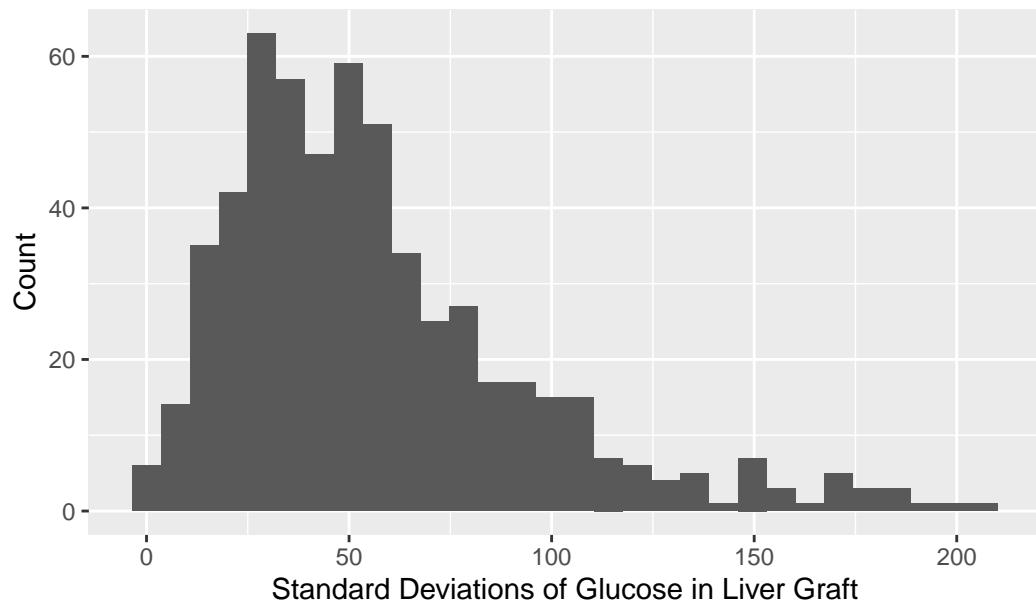
`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

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 |

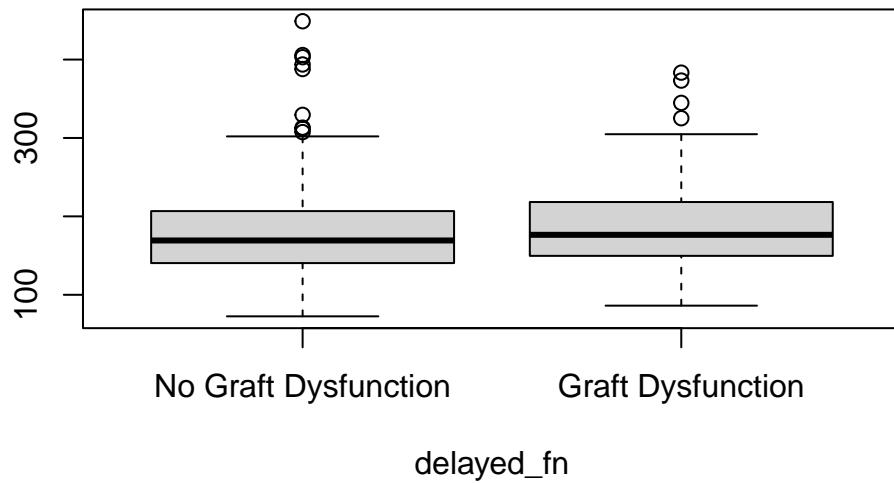


Graft Dysfunction Rate

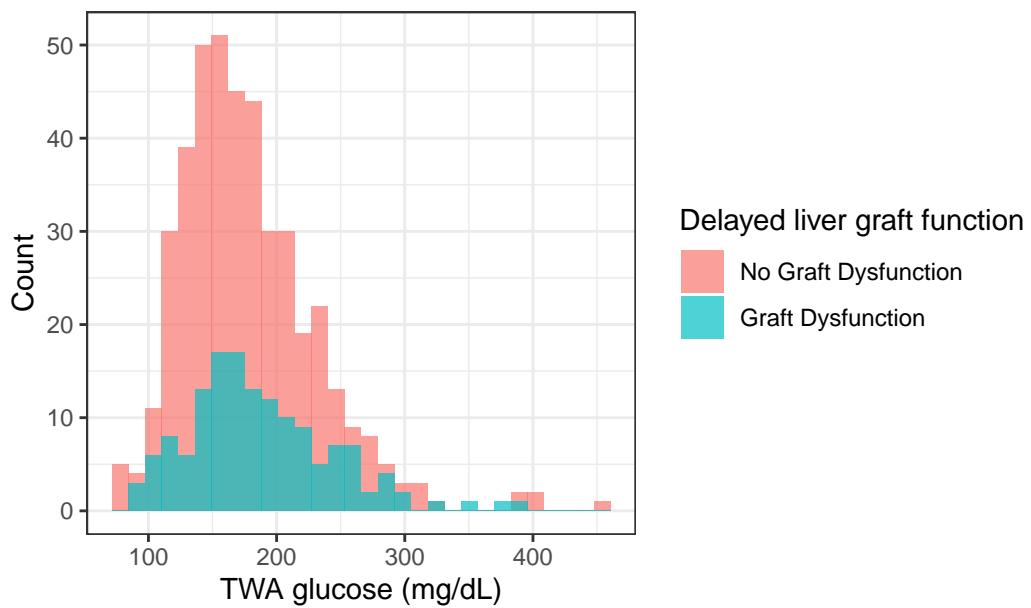


weighted average of glucose observations in liver graft

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)
```

```

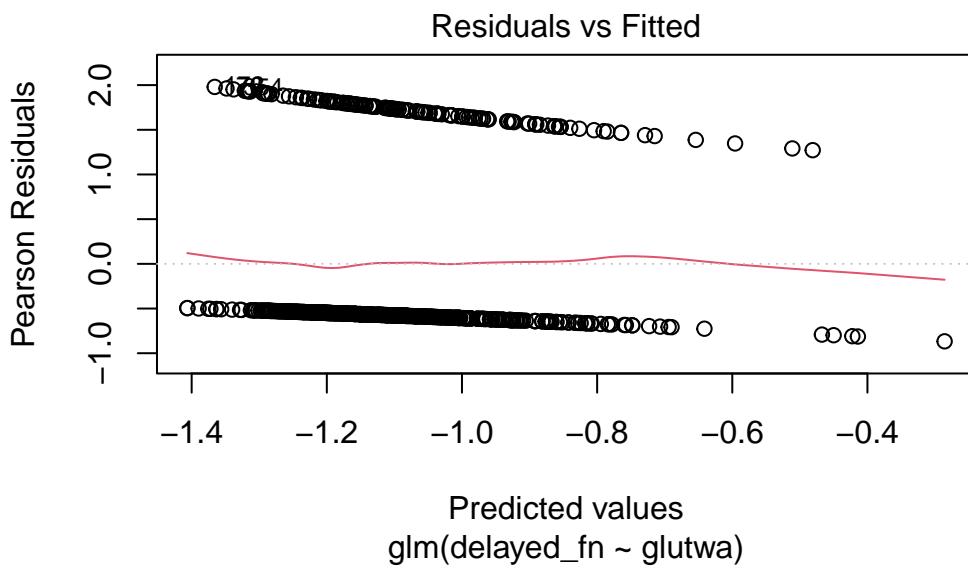
Coefficients:
            Estimate Std. Error z value Pr(>|z|)
(Intercept) -1.622352  0.330433 -4.910 9.12e-07 ***
glutwa       0.002978  0.001716  1.735   0.0828 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

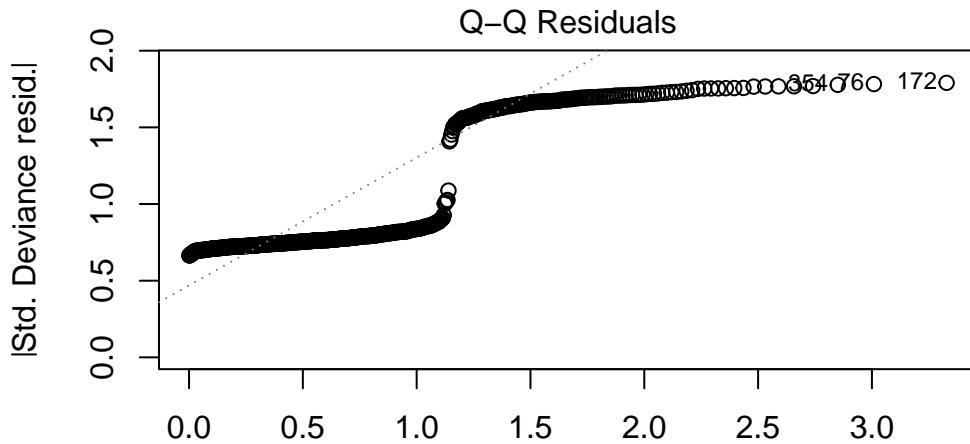
(Dispersion parameter for binomial family taken to be 1)

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

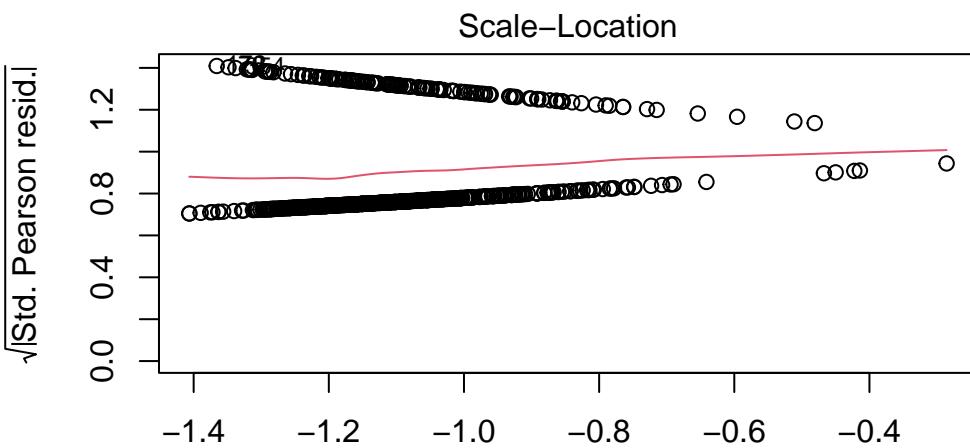
Number of Fisher Scoring iterations: 4

```

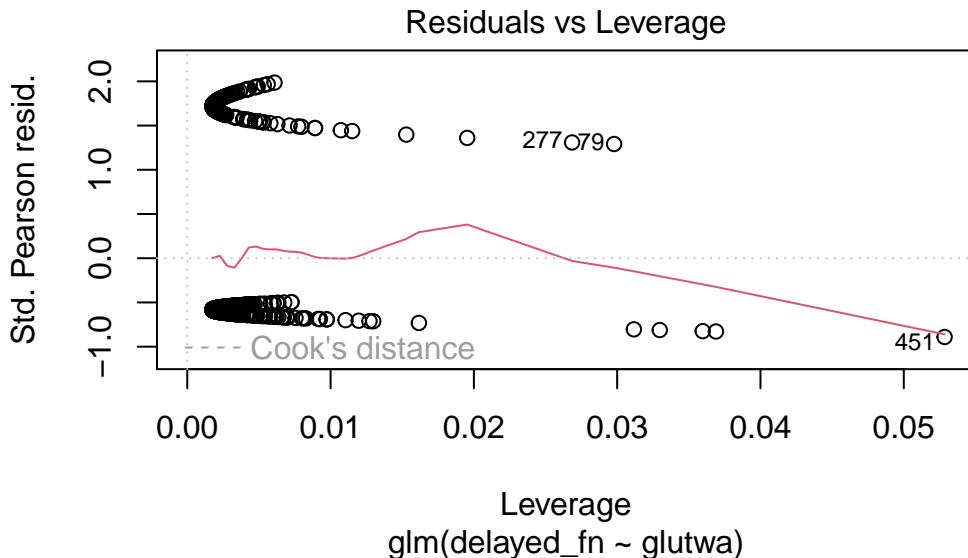




Theoretical Quantiles
glm(delayed_fn ~ glutwa)



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