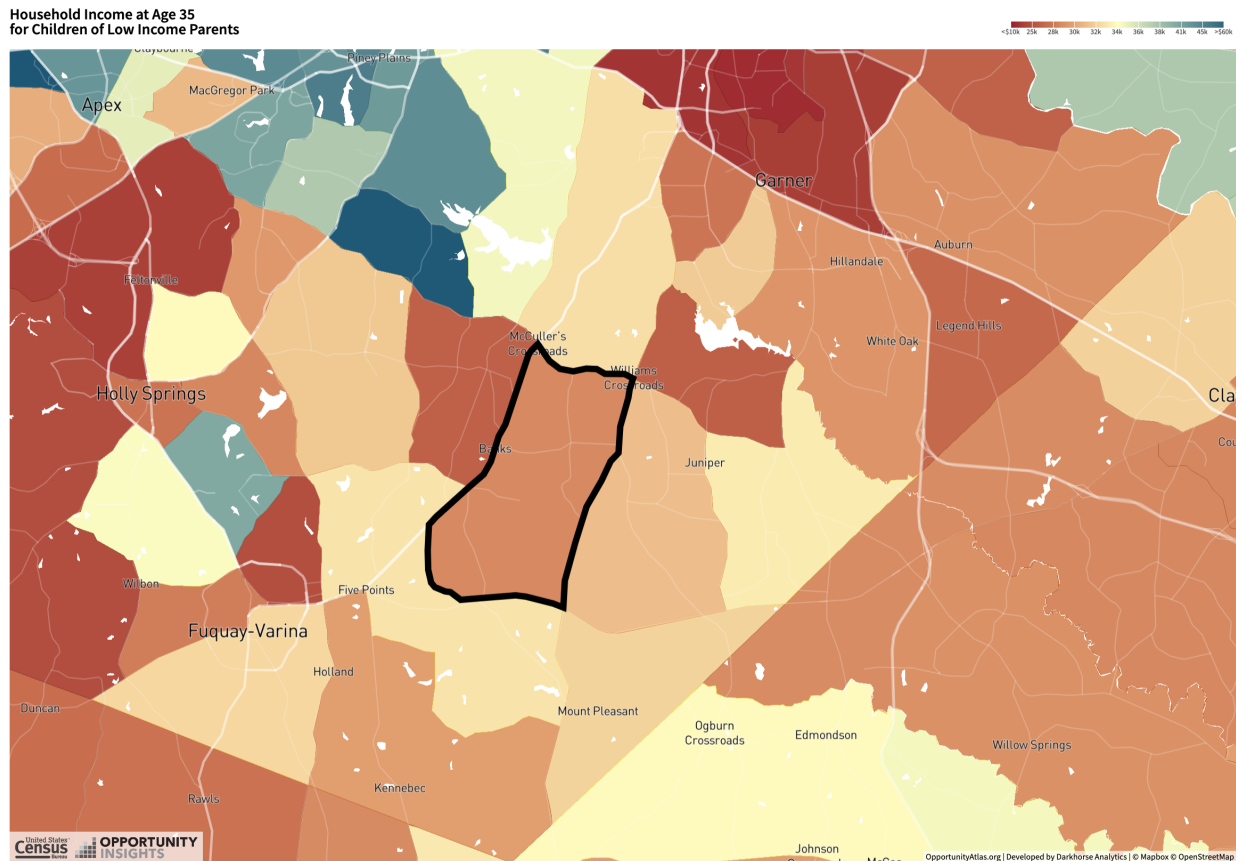


# Project\_Pt1

2023-02-25

**Question 1** My name is Jose and I am from Willow Spring, North Carolina. The map below shows adult household income for children born to low income parents. Compared to similar children nationwide, my neighborhood has below average outcomes.



**#Question 2: Summary statistics of all variables, including recording all missing values.**  
summary(atlas)

```
##      state      county      tract      tract_name
## Min.   : 1.00   Min.   : 1.00   Min.   : 100   Length:73199
## 1st Qu.:13.00   1st Qu.: 29.00   1st Qu.: 10300  Class :character
## Median :28.00   Median : 63.00   Median : 44702  Mode  :character
## Mean   :28.18   Mean   : 85.95   Mean   :255238
## 3rd Qu.:42.00   3rd Qu.:109.00   3rd Qu.:458650
## Max.   :72.00   Max.   :840.00   Max.   :989200
##
##      cz      czname      kfr_pooled_pooled_p25 kfr_natam_pooled_p25
## Min.   : 100   Length:73199   Min.   : -3.286   Min.   : -9.99
```

```

## 1st Qu.:11600   Class :character   1st Qu.: 38.070       1st Qu.: 27.80
## Median :19902   Mode  :character   Median : 42.520       Median : 33.41
## Mean   :21974                                     Mean   : 42.858       Mean   : 34.45
## 3rd Qu.:32000                                     3rd Qu.: 47.350       3rd Qu.: 40.08
## Max.   :90000                                     Max.   :103.349       Max.   :107.68
##                                     NA's   :1189          NA's   :71464
## kfr_asian_pooled_p25 kfr_black_pooled_p25 kfr_hisp_pooled_p25
## Min.   :-13.32   Min.   :-48.47   Min.   :-23.97
## 1st Qu.: 51.50   1st Qu.: 29.97   1st Qu.: 39.11
## Median : 57.96   Median : 33.03   Median : 43.27
## Mean   : 57.98   Mean   : 33.99   Mean   : 43.70
## 3rd Qu.: 64.32   3rd Qu.: 37.01   3rd Qu.: 47.65
## Max.   :113.61   Max.   : 99.52   Max.   :125.98
## NA's   :57759    NA's   :39111    NA's   :35581
## kfr_white_pooled_p25 kir_pooled_female_p25 kir_pooled_male_p25
## Min.   :-13.92   Min.   :-42.61   Min.   :-21.42
## 1st Qu.: 41.43   1st Qu.: 37.38   1st Qu.: 42.47
## Median : 45.74   Median : 40.98   Median : 46.81
## Mean   : 46.30   Mean   : 41.86   Mean   : 47.10
## 3rd Qu.: 50.72   3rd Qu.: 45.56   3rd Qu.: 51.44
## Max.   :103.18   Max.   : 87.90   Max.   :105.74
## NA's   :5221     NA's   :1554     NA's   :1512
## kir_natam_female_p25 kir_asian_female_p25 kir_black_female_p25
## Min.   :17.21     Min.   :-43.99   Min.   : 4.04
## 1st Qu.:30.80     1st Qu.: 51.04   1st Qu.:38.09
## Median :34.69     Median : 57.60   Median :41.35
## Mean   :35.12     Mean   : 57.49   Mean   :42.02
## 3rd Qu.:38.91     3rd Qu.: 63.87   3rd Qu.:45.32
## Max.   :76.50     Max.   :166.61   Max.   :89.37
## NA's   :72350     NA's   :65467    NA's   :47861
## kir_hisp_female_p25 kir_white_female_p25 kir_natam_male_p25 kir_asian_male_p25
## Min.   :-15.03   Min.   :-74.19   Min.   :15.66   Min.   :-124.87
## 1st Qu.: 38.64   1st Qu.: 36.45   1st Qu.:32.85   1st Qu.: 52.81
## Median : 42.74   Median : 40.83   Median :38.54   Median : 58.69
## Mean   : 43.12   Mean   : 41.83   Mean   :39.21   Mean   : 58.86
## 3rd Qu.: 47.20   3rd Qu.: 46.19   3rd Qu.:44.97   3rd Qu.: 65.02
## Max.   : 92.85   Max.   :109.12   Max.   :71.51   Max.   :114.93
## NA's   :47319    NA's   :7983     NA's   :72347    NA's   :65112
## kir_black_male_p25 kir_hisp_male_p25 kir_white_male_p25 jail_pooled_pooled_p25
## Min.   :-20.40   Min.   :-24.03   Min.   :-100.99   Min.   :-0.2145
## 1st Qu.: 35.17   1st Qu.: 45.23   1st Qu.: 44.82   1st Qu.: 0.0070
## Median : 39.05   Median : 49.62   Median : 49.38   Median : 0.0180
## Mean   : 39.57   Mean   : 49.80   Mean   : 49.84   Mean   : 0.0216
## 3rd Qu.: 43.42   3rd Qu.: 54.04   3rd Qu.: 54.48   3rd Qu.: 0.0325
## Max.   : 85.17   Max.   :119.73   Max.   :111.89   Max.   : 0.6909
## NA's   :48140    NA's   :47796    NA's   :7683     NA's   :1322
## jail_natam_pooled_p25 jail_asian_pooled_p25 jail_black_pooled_p25
## Min.   :-0.11     Min.   :-0.82     Min.   :-0.55
## 1st Qu.: 0.00     1st Qu.: -0.02    1st Qu.: 0.02
## Median : 0.03     Median : 0.00     Median : 0.05
## Mean   : 0.04     Mean   : 0.00     Mean   : 0.05
## 3rd Qu.: 0.06     3rd Qu.: 0.02     3rd Qu.: 0.08
## Max.   : 0.43     Max.   : 0.79     Max.   : 0.56
## NA's   :71790     NA's   :59738     NA's   :42014

```

```

## jail_hisp_pooled_p25 jail_white_pooled_p25 jail_pooled_female_p25
## Min. :-0.40 Min. :-0.636 Min. :-0.5948
## 1st Qu.: 0.00 1st Qu.: 0.002 1st Qu.: -0.0036
## Median : 0.01 Median : 0.013 Median : 0.0029
## Mean : 0.02 Mean : 0.017 Mean : 0.0038
## 3rd Qu.: 0.03 3rd Qu.: 0.027 3rd Qu.: 0.0105
## Max. : 0.83 Max. : 0.820 Max. : 0.3893
## NA's :38468 NA's :5816 NA's :1723
## jail_pooled_male_p25 jail_natam_female_p25 jail_asian_female_p25
## Min. :-0.5659 Min. :-0.11 Min. :-0.46
## 1st Qu.: 0.0123 1st Qu.: -0.01 1st Qu.: -0.02
## Median : 0.0333 Median : 0.00 Median : 0.00
## Mean : 0.0409 Mean : 0.01 Mean : 0.00
## 3rd Qu.: 0.0618 3rd Qu.: 0.02 3rd Qu.: 0.02
## Max. : 1.1290 Max. : 0.16 Max. : 0.34
## NA's :1725 NA's :72505 NA's :66571
## jail_black_female_p25 jail_hisp_female_p25 jail_white_female_p25
## Min. :-0.16 Min. :-0.19 Min. :-1.300
## 1st Qu.: -0.01 1st Qu.: -0.01 1st Qu.: -0.008
## Median : 0.00 Median : 0.00 Median : 0.003
## Mean : 0.01 Mean : 0.00 Mean : 0.004
## 3rd Qu.: 0.02 3rd Qu.: 0.01 3rd Qu.: 0.015
## Max. : 0.32 Max. : 0.31 Max. : 1.355
## NA's :49929 NA's :49276 NA's :8717
## jail_natam_male_p25 jail_asian_male_p25 jail_black_male_p25 jail_hisp_male_p25
## Min. :-0.06 Min. :-2.04 Min. :-0.45 Min. :-1.27
## 1st Qu.: 0.01 1st Qu.: -0.02 1st Qu.: 0.06 1st Qu.: 0.00
## Median : 0.05 Median : 0.00 Median : 0.10 Median : 0.02
## Mean : 0.06 Mean : 0.01 Mean : 0.11 Mean : 0.03
## 3rd Qu.: 0.10 3rd Qu.: 0.03 3rd Qu.: 0.15 3rd Qu.: 0.05
## Max. : 0.42 Max. : 1.77 Max. : 0.71 Max. : 0.84
## NA's :72572 NA's :66368 NA's :51527 NA's :50725
## jail_white_male_p25 HOLC_A HOLC_B HOLC_C
## Min. :-1.044 Min. :0.00 Min. :0.00 Min. :0.00
## 1st Qu.: 0.004 1st Qu.:0.00 1st Qu.:0.00 1st Qu.:0.00
## Median : 0.023 Median :0.00 Median :0.00 Median :0.17
## Mean : 0.029 Mean :0.03 Mean :0.13 Mean :0.33
## 3rd Qu.: 0.048 3rd Qu.:0.00 3rd Qu.:0.11 3rd Qu.:0.62
## Max. : 1.212 Max. :1.00 Max. :1.00 Max. :1.00
## NA's :8623 NA's :63923 NA's :63923 NA's :63923
## HOLC_D pm25_1982 pm25_1990 pm25_2000
## Min. :0.00 Min. : 1.97 Min. : 1.501 Min. : 1.64
## 1st Qu.:0.00 1st Qu.:16.68 1st Qu.:13.494 1st Qu.:10.21
## Median :0.00 Median :20.85 Median :17.094 Median :12.71
## Mean :0.23 Mean :20.41 Mean :16.844 Mean :12.50
## 3rd Qu.:0.38 3rd Qu.:24.28 3rd Qu.:20.106 3rd Qu.:14.79
## Max. :1.00 Max. :35.92 Max. :32.744 Max. :25.37
## NA's :63923 NA's :1296 NA's :1296 NA's :1296
## pm25_2010 vegetation extreme_heat developed
## Min. : 1.531 Min. :-0.6337 Min. :-14.2736 Min. :0.0000
## 1st Qu.: 7.887 1st Qu.: -0.1392 1st Qu.: 0.2996 1st Qu.:0.1233
## Median : 9.506 Median :-0.0695 Median : 2.6096 Median :0.6734
## Mean : 9.286 Mean :-0.0838 Mean : 2.6758 Mean :0.5751
## 3rd Qu.:10.799 3rd Qu.: -0.0119 3rd Qu.: 5.2012 3rd Qu.:0.9983

```

## Max. :16.958	Max. : 0.3957	Max. : 14.6032	Max. :1.0000
## NA's :1296	NA's :2531	NA's :2531	NA's :2531
## hhinc_mean2000	mean_commutetime2000	frac_coll_plus2000	frac_coll_plus2010
## Min. : 7240	Min. : 2.50	Min. :0.0000	Min. :0.0000
## 1st Qu.: 57377	1st Qu.:22.04	1st Qu.:0.1108	1st Qu.:0.1310
## Median : 71721	Median :26.17	Median :0.1870	Median :0.2186
## Mean : 80335	Mean :26.95	Mean :0.2378	Mean :0.2694
## 3rd Qu.: 94675	3rd Qu.:31.05	3rd Qu.:0.3254	3rd Qu.:0.3709
## Max. :330042	Max. :80.03	Max. :1.0000	Max. :1.0000
## NA's :893	NA's :882	NA's :852	NA's :202
## foreign_share2010	med_hhinc1990	med_hhinc2016	popdensity2000
## Min. :0.0000	Min. : 4999	Min. : 3250	Min. : 0.00
## 1st Qu.:0.0230	1st Qu.: 22261	1st Qu.: 38809	1st Qu.: 97.78
## Median :0.0671	Median : 29810	Median : 52333	Median : 760.47
## Mean :0.1209	Mean : 32179	Mean : 58898	Mean : 1987.44
## 3rd Qu.:0.1689	3rd Qu.: 39409	3rd Qu.: 71935	3rd Qu.: 2005.30
## Max. :1.0000	Max. :150001	Max. :250001	Max. :205382.19
## NA's :916	NA's :882	NA's :436	NA's :726
## poor_share2010	poor_share2000	poor_share1990	share_white2010
## Min. :0.00000	Min. :0.0000	Min. :0.0000	Min. :0.0000
## 1st Qu.:0.05911	1st Qu.:0.0502	1st Qu.:0.0488	1st Qu.:0.4156
## Median :0.11581	Median :0.0956	Median :0.0955	Median :0.7355
## Mean :0.15092	Mean :0.1284	Mean :0.1322	Mean :0.6327
## 3rd Qu.:0.20493	3rd Qu.:0.1715	3rd Qu.:0.1752	3rd Qu.:0.8922
## Max. :1.00000	Max. :1.0000	Max. :1.0000	Max. :1.0000
## NA's :262	NA's :880	NA's :872	NA's :84
## share_black2010	share_hisp2010	share_asian2010	share_black2000
## Min. :0.00000	Min. :0.00000	Min. :0.0000	Min. :0.0000
## 1st Qu.:0.01336	1st Qu.:0.02443	1st Qu.:0.0039	1st Qu.:0.0090
## Median :0.04345	Median :0.06308	Median :0.0117	Median :0.0328
## Mean :0.14089	Mean :0.16099	Mean :0.0377	Mean :0.1316
## 3rd Qu.:0.15185	3rd Qu.:0.18790	3rd Qu.:0.0350	3rd Qu.:0.1297
## Max. :1.00000	Max. :1.00000	Max. :0.8918	Max. :1.0000
## NA's :84	NA's :84	NA's :1250	NA's :827
## share_white2000	share_hisp2000	share_asian2000	gsmn_math_g3_2013
## Min. :0.0000	Min. :0.0000	Min. :0.0000	Min. : -2.706
## 1st Qu.:0.5331	1st Qu.:0.0132	1st Qu.:0.0031	1st Qu.: 2.608
## Median :0.8132	Median :0.0361	Median :0.0092	Median : 3.220
## Mean :0.6943	Mean :0.1182	Mean :0.0306	Mean : 3.188
## 3rd Qu.:0.9302	3rd Qu.:0.1215	3rd Qu.:0.0280	3rd Qu.: 3.761
## Max. :1.0000	Max. :1.0000	Max. :0.9000	Max. : 6.878
## NA's :827	NA's :827	NA's :2146	NA's :1109
## rent_twobed2015	singleparent_share2010	singleparent_share2000	
## Min. : 99.0	Min. :0.0000	Min. :0.0000	
## 1st Qu.: 682.0	1st Qu.:0.1851	1st Qu.:0.1825	
## Median : 853.0	Median :0.2970	Median :0.2588	
## Mean : 951.2	Mean :0.3322	Mean :0.2935	
## 3rd Qu.:1125.0	3rd Qu.:0.4435	3rd Qu.:0.3663	
## Max. :3501.0	Max. :1.0000	Max. :1.0000	
## NA's :16592	NA's :631	NA's :910	
## singleparent_share1990	traveltime15_2010	emp2000	mail_return_rate2010
## Min. :0.0000	Min. :0.0000	Min. :0.0000	Min. : 0.00
## 1st Qu.:0.1242	1st Qu.:0.1842	1st Qu.:0.5331	1st Qu.: 74.30
## Median :0.1869	Median :0.2655	Median :0.6080	Median : 79.70

```
## Mean :0.2288      Mean :0.2950      Mean :0.5945      Mean : 78.73
## 3rd Qu.:0.2857      3rd Qu.:0.3762      3rd Qu.:0.6709      3rd Qu.: 84.30
## Max. :1.0000      Max. :1.0000      Max. :1.0000      Max. :100.00
## NA's :999      NA's :256      NA's :851      NA's :652
## ln_wage_growth_hs_grad jobs_total_5mi_2015 jobs_highpay_5mi_2015
## Min. : -3.199      Min. : 0      Min. : 0
## 1st Qu.: -0.137      1st Qu.: 6522      1st Qu.: 2304
## Median : 0.046      Median : 42385      Median : 16981
## Mean : 0.042      Mean : 111996      Mean : 58566
## 3rd Qu.: 0.224      3rd Qu.: 122916      3rd Qu.: 57828
## Max. : 3.075      Max. :2826437      Max. :1794186
## NA's :21563      NA's :888      NA's :888
## popdensity2010      ann_avg_job_growth_2004_2013      job_density_2013
## Min. : 0.0      Min. : -0.6067      Min. : 0.0
## 1st Qu.: 319.4      1st Qu.: -0.0189      1st Qu.: 56.7
## Median : 2193.8      Median : 0.0085      Median : 412.6
## Mean : 5236.2      Mean : 0.0153      Mean : 2157.0
## 3rd Qu.: 5277.5      3rd Qu.: 0.0410      3rd Qu.: 1371.1
## Max. :543333.3      Max. : 1.3365      Max. :2905290.2
## NA's :5      NA's :2531      NA's :736
```

Most variables have at least some number of missing values. Many of them lack values for almost all tracts, especially the variables that pool data at the household level for different racial groups. This may be because many racial tracts do not have enough people belonging to that racial group to collect enough aggregate data for that given variable.

**Question 3** The `kfr_pooled_pooled_p25` variable calculates the mean percentile rank for household income for people born to parents at the 25th percentile of the national distribution of household income. In other words, the higher the value for this variable, the higher absolute mobility. This is calculated with using a linear model to capture the effect that being born to parents at the 25th percentile of household income will have on income outcomes as adults, pooled at the census tract level.

*#Question 4: Histogram of Absolute Mobility at the 25th percentile*

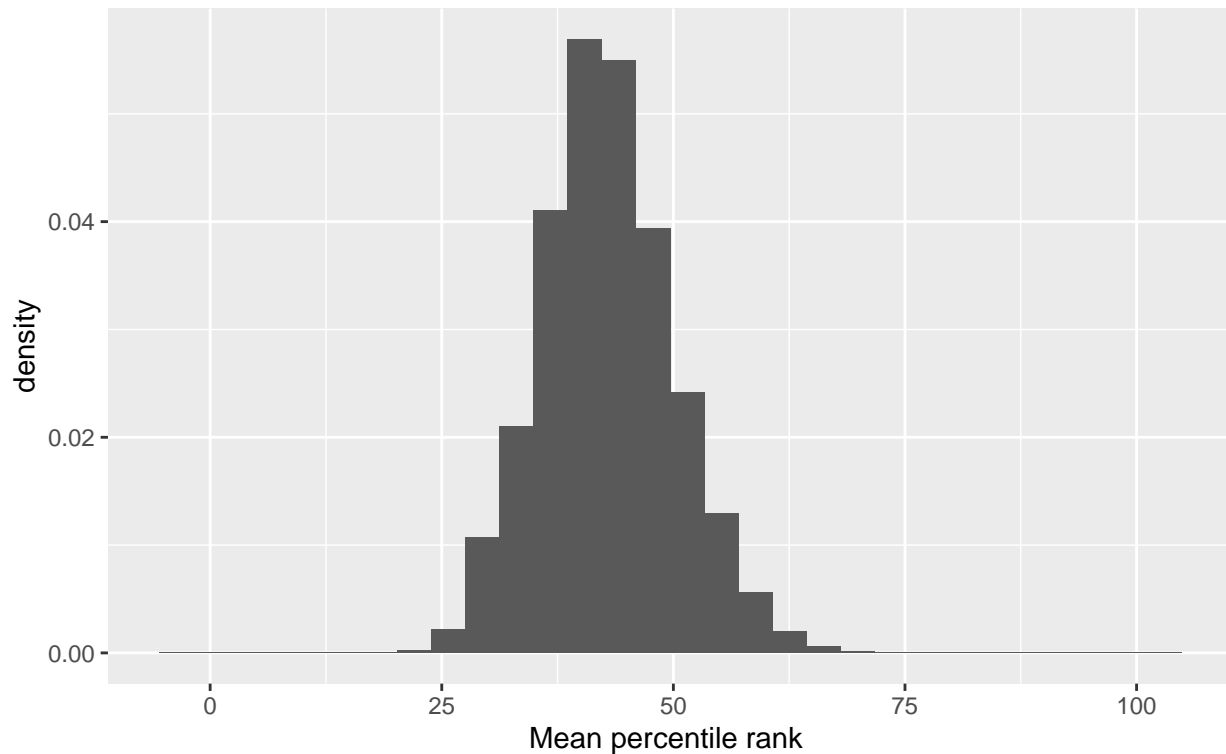
```
absmob_histo <- atlas |>
  ggplot() +
  geom_histogram(aes(x = kfr_pooled_pooled_p25, y = after_stat(density))) +
  labs(title = "Ranked Absolute Mobility at the 25th Percentile",
       subtitle = "For household income 2014-15",
       x = "Mean percentile rank ")
absmob_histo
```

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

```
## Warning: Removed 1189 rows containing non-finite values (`stat_bin()`).
```

## Ranked Absolute Mobility at the 25th Percentile

For household income 2014–15



```
ggsave("absmob_histo.png")
```

```
## Saving 6.5 x 4.5 in image
```

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

```
## Warning: Removed 1189 rows containing non-finite values (`stat_bin()`).
```