Analysis of The Green Chair Project Client Demographics

STATCOM

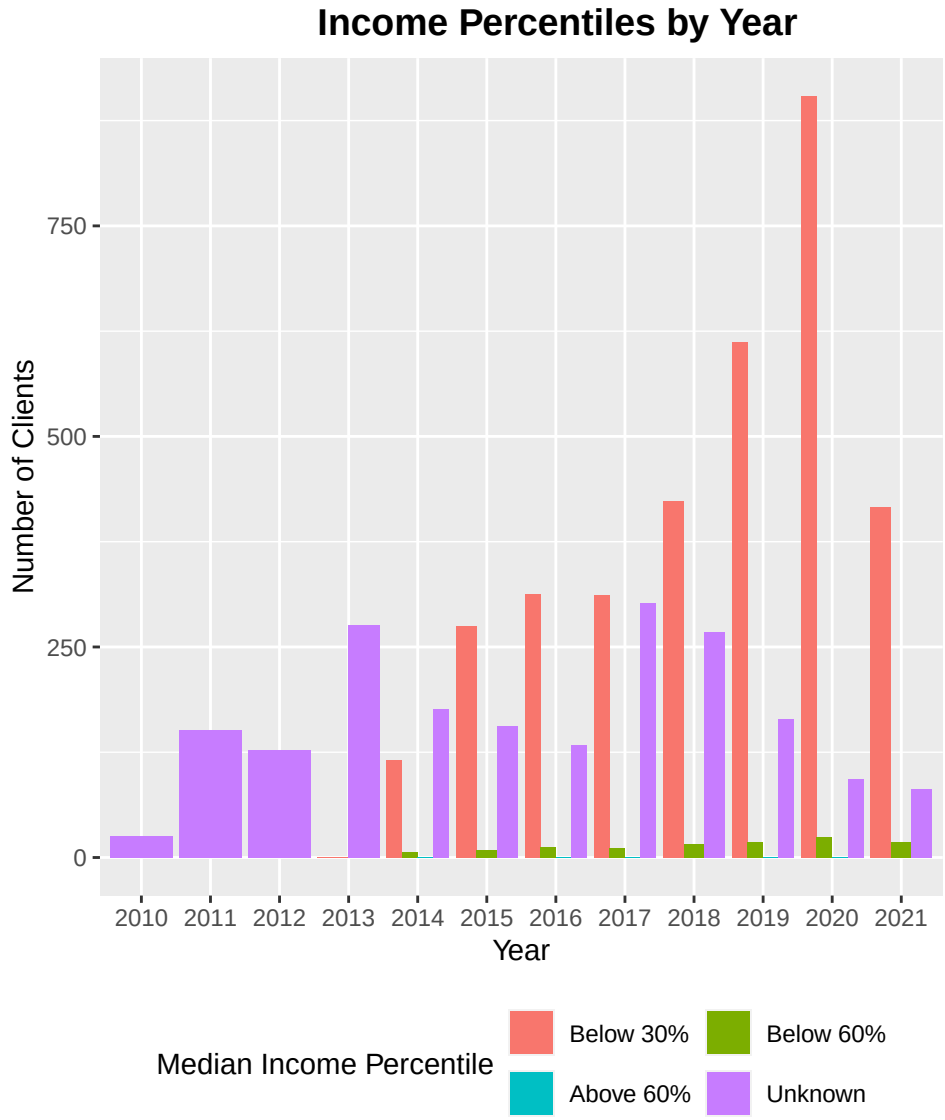
Abstract

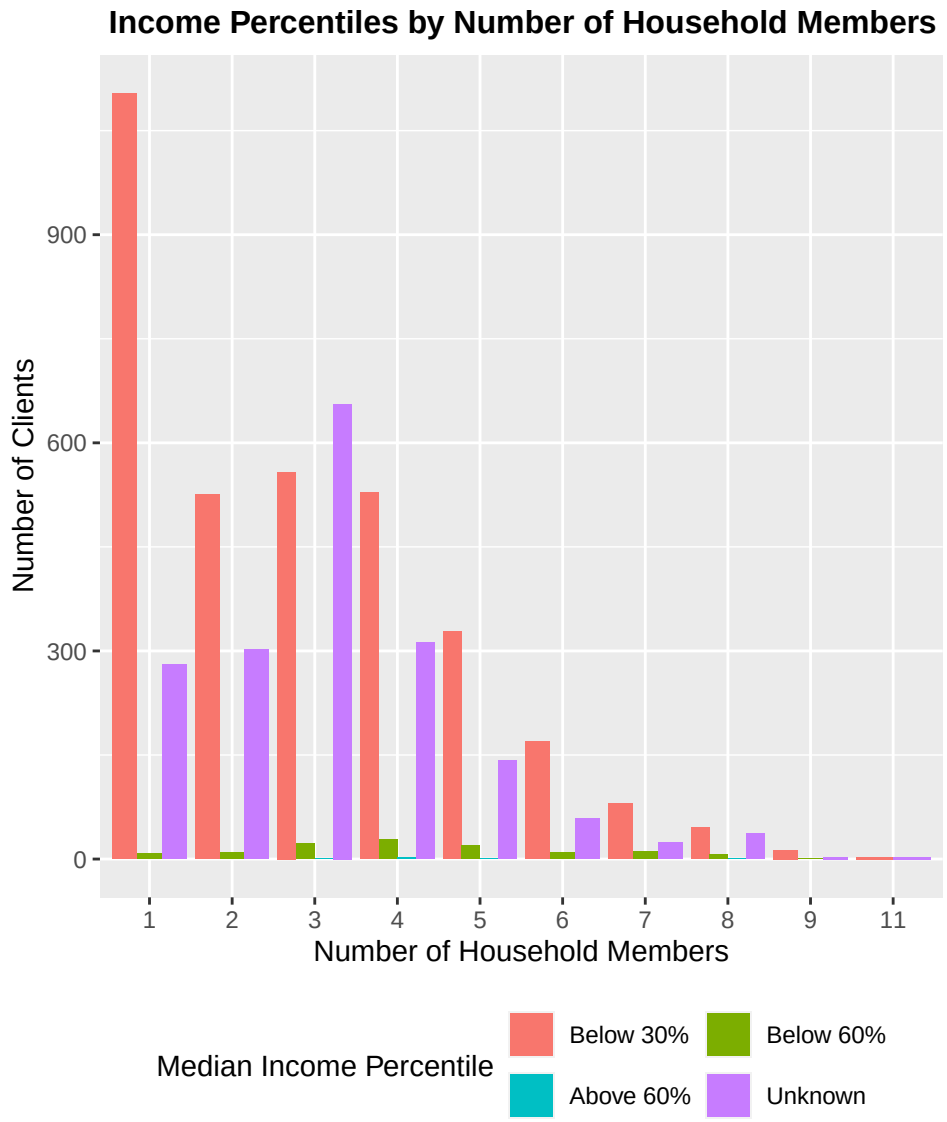
This report contains an exploration and initial analysis of data on The Green Chair Project's (TGCP) clients, Wake County public schools, and the CDC Social Vulnerability Indices of Wake County's census tracts.

Contents

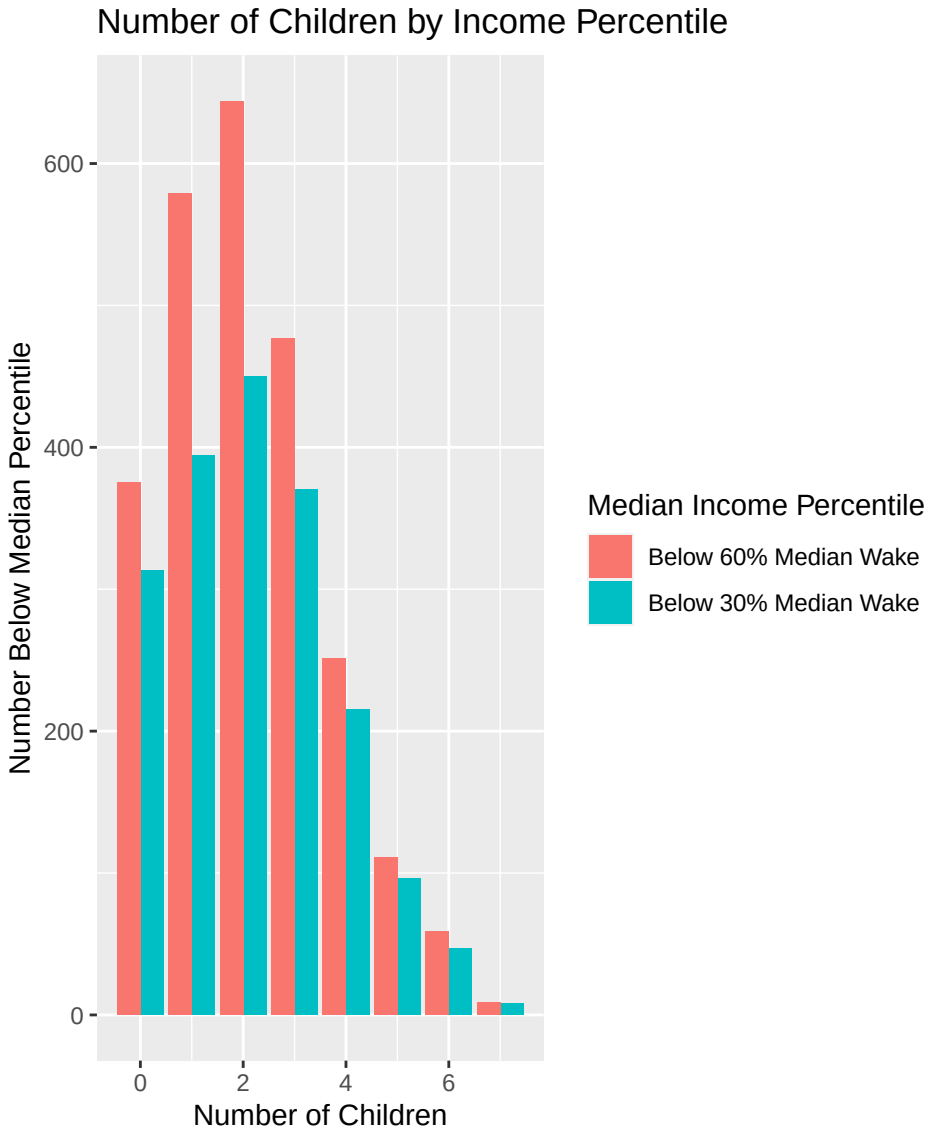
1 Exploring TGCP data

We have spent a lot of time cleaning the data, allowing us to start making visualizations. First, we wanted to answer how many clients are living below the 30% median income line, how many are in the 30% and 60% range, and how many are above the 60% range. It's important to note that the thresholds for these classifcations change both by year and by the number of people that live in a household. You can see the thresholds for 2021 here, provided by the HOME Investment Partnerships Program. Note that we are using the threshold for Raleigh. With all that in mind, we have categorized each client/family as being below the 30% line, between 30% and 60%, above 60%, or unknown (if the income data was unavailable).



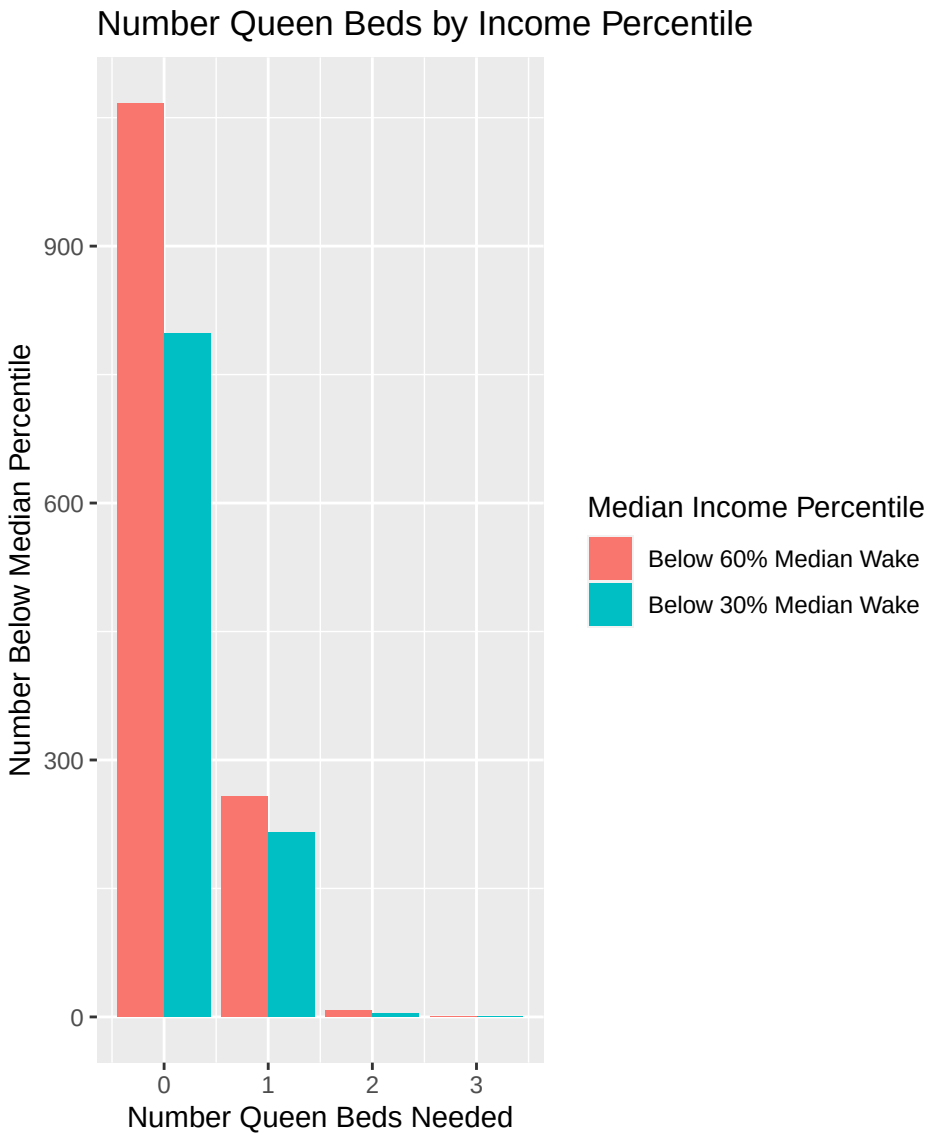


In the following plots, the Area Median Income levels are taken from the HOME Investment Parnerships Program for Raleigh in year 2021.



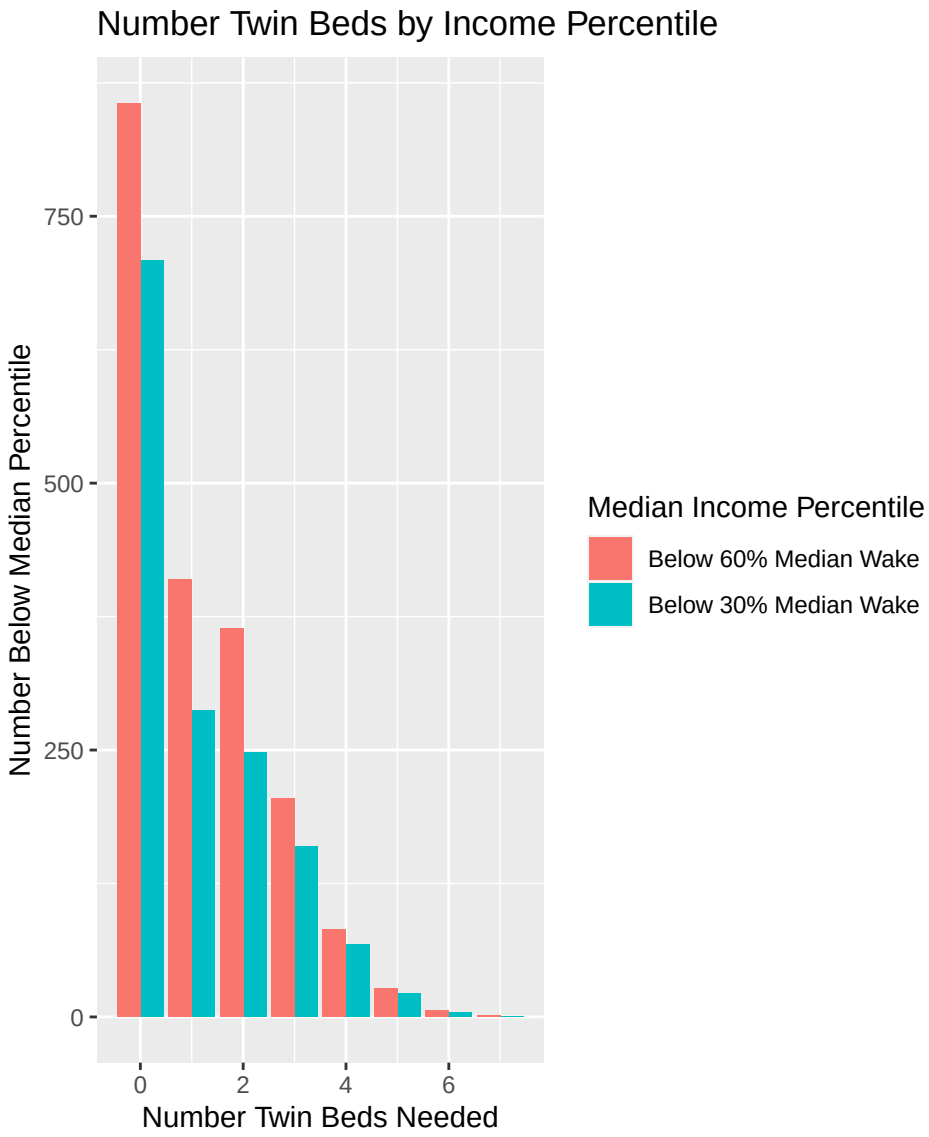
Some things to note:

- We see that the number of all of those below a certain median income level maximizes around two children, and drops off with more children



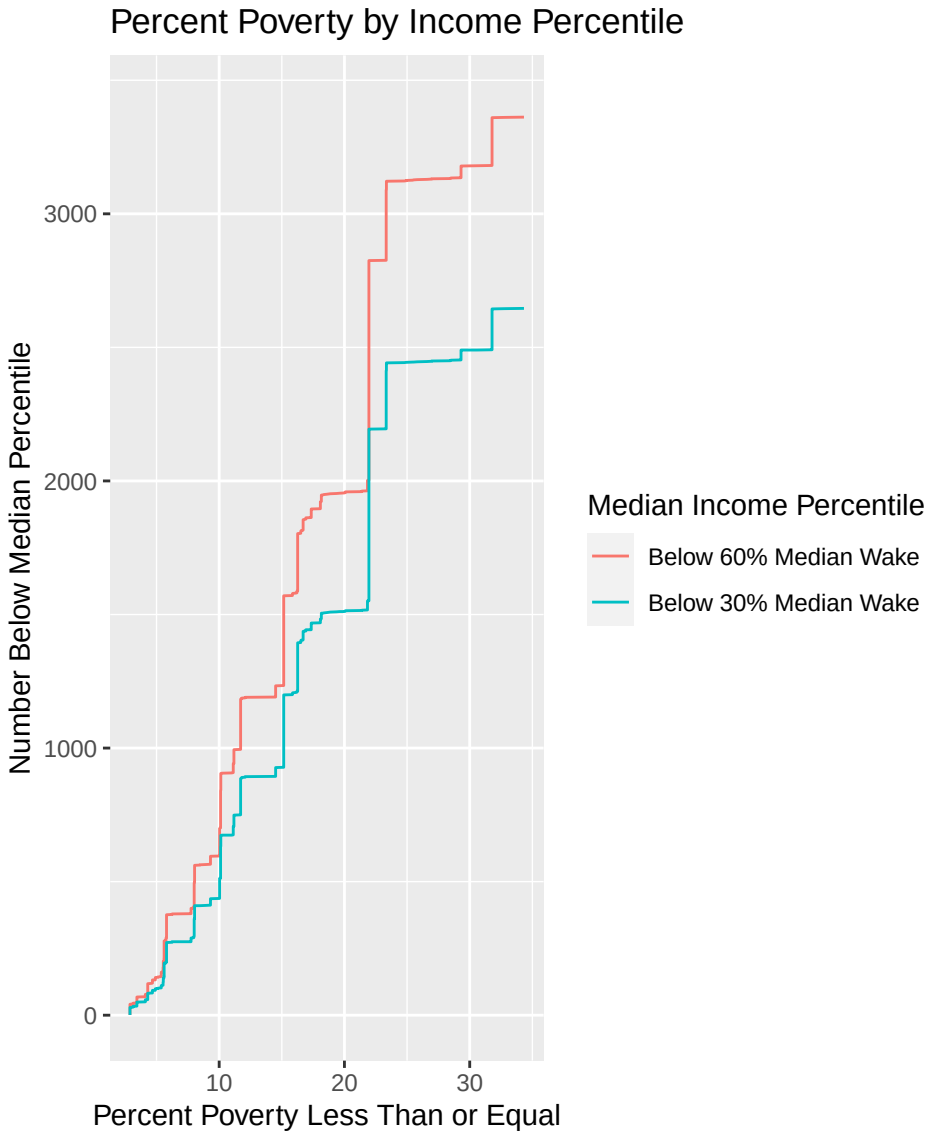
Some things to note:

- Most people who need a queen bed are not below a certain median income level



Some things to note:

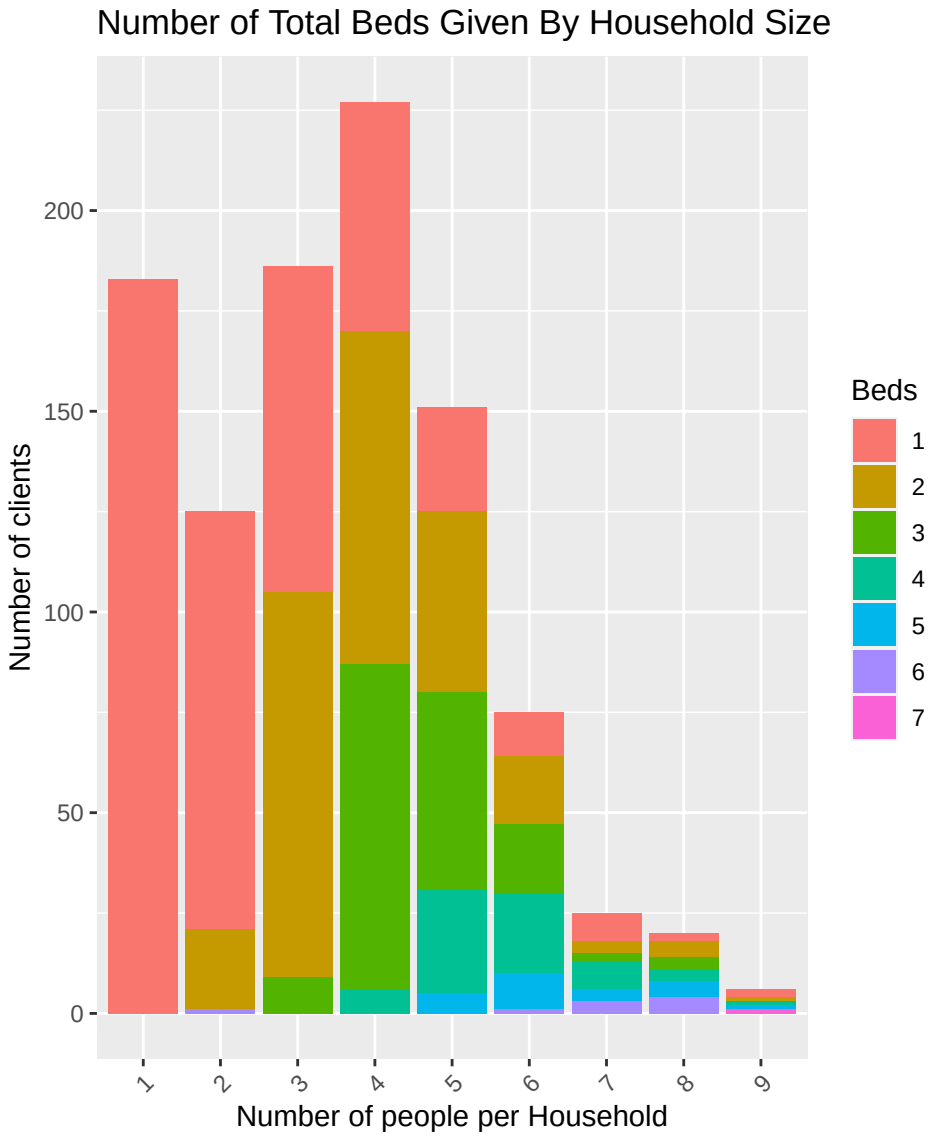
- Most people who need a twin bed are not below a certain median income level



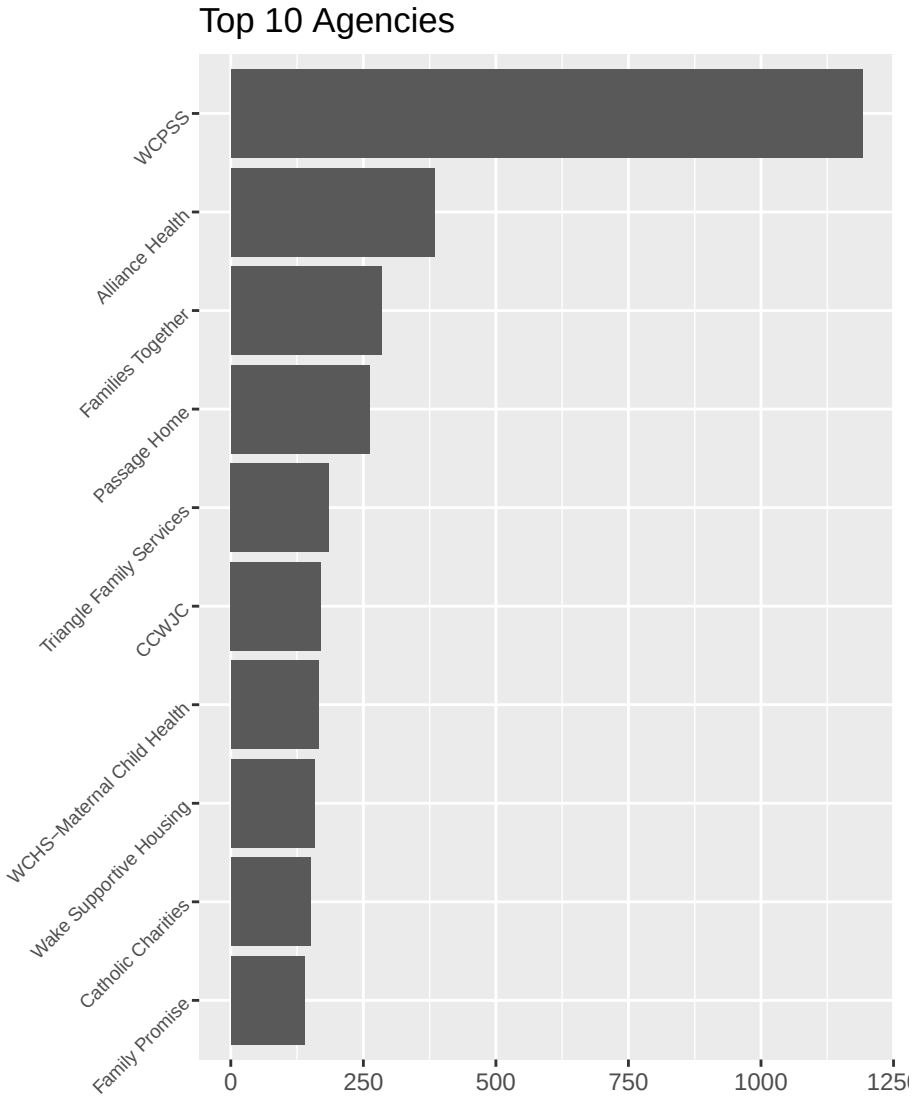
Some things to note:

- We see that the number of people below a certain income level accumulates at much larger steps as one's area surpasses a certain percent of impoverishment. Note: the percent poverty is taken from the CDC SVIs (see next section).

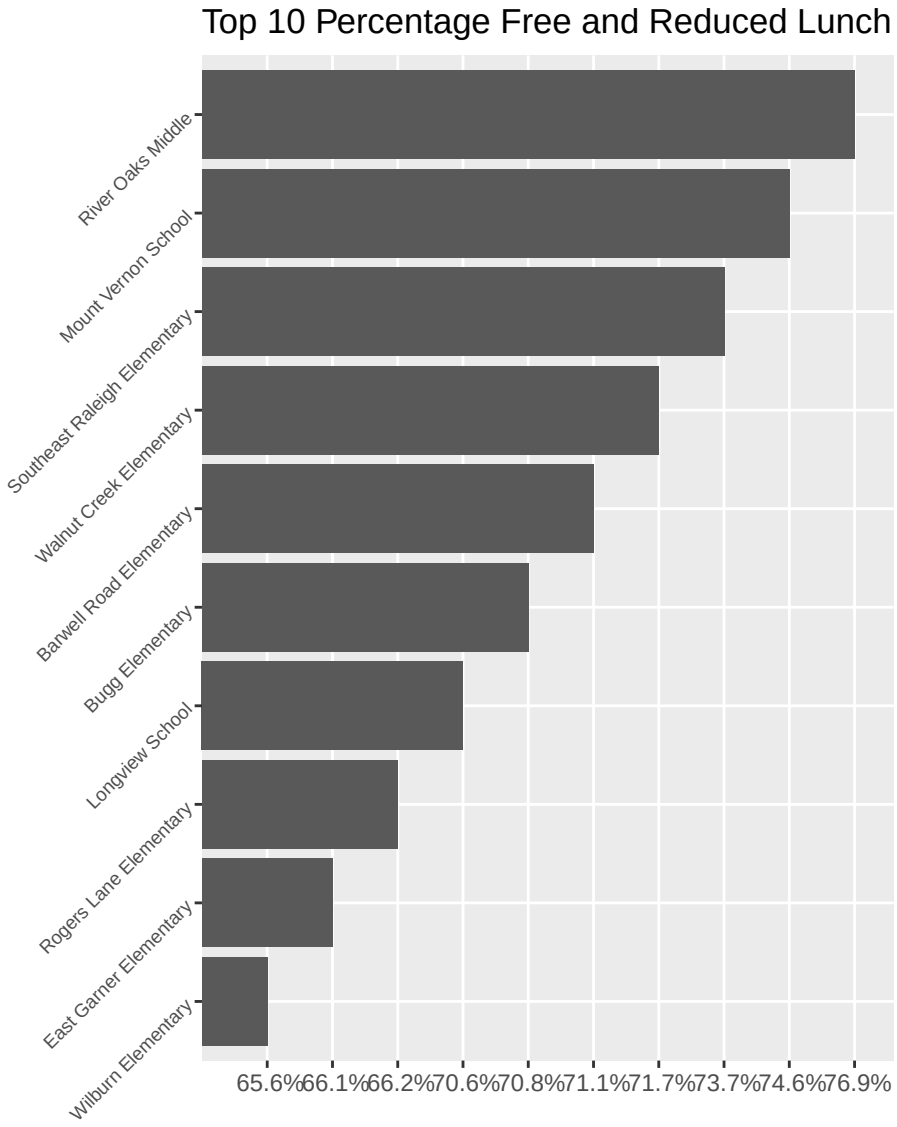
We have also looked at the total number of beds provided to clients (number of twins and queens combined). Again, since this may changed based on the number of members of a household, we have stratified.

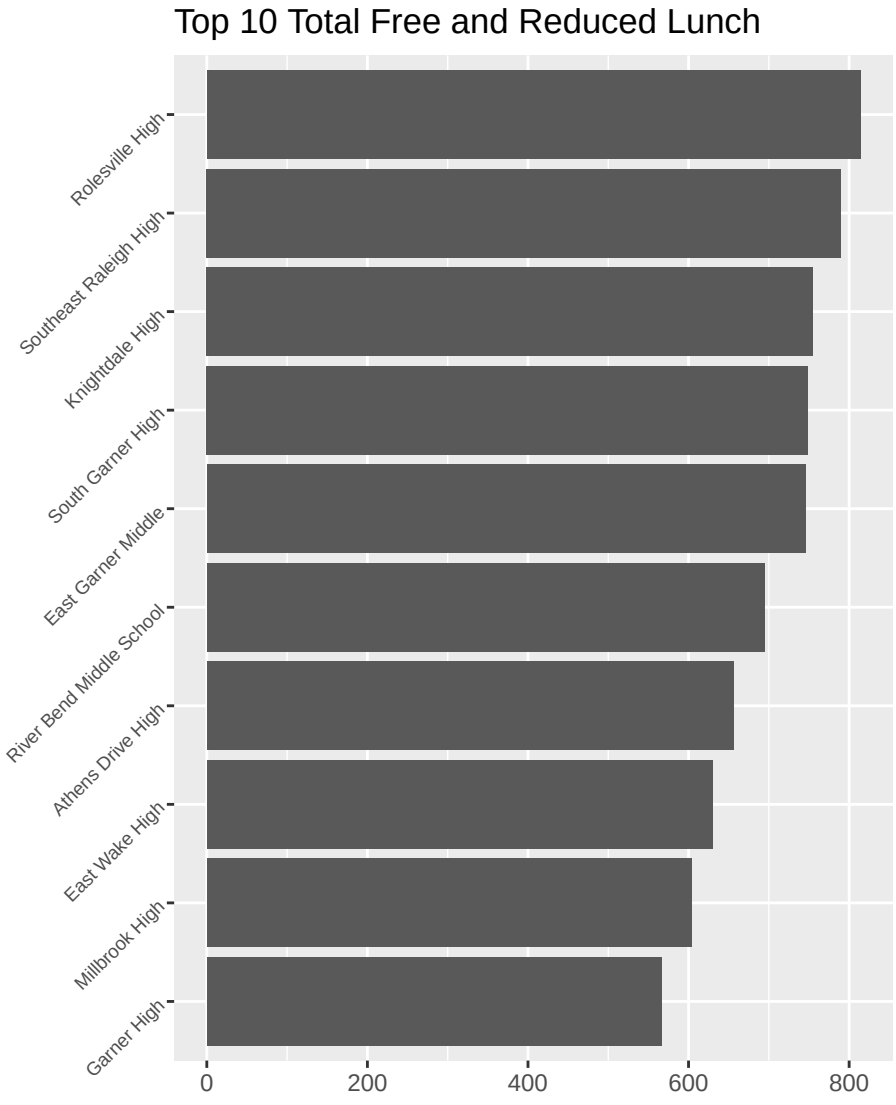


Next we wanted to investigate which agencies refered the most clients. From this, we can get a better grasp on where the clients are coming from and how to best serve them. These are the ten agencies that refer the most clients.



As expected, the Wake Country Public School System was referred the most by far, with nearly 1200 referrals. This has encouraged us to look further into the schools. We are compiling data including drop out/graduation rates, test scores, and free and reduced lunch participation for each public school in Wake county. Then we will be able to cross reference this with our data to find correlations between clients referred to TGCP and these external, school variables. Here we present the schools with the highest percentage of their students enrolled in the free and reduced lunch program as well as the schools with most highest total number of students enrolled in a lunch program.


Top 10 Percentage Free and Reduced Lunch
River Oaks Middle
Mount Vernon School
Southeast Raleigh Elementary
Walnut Creek Elementary
Barwell Road Elementary
Bugg Elementary
Longview School
Rogers Lane Elementary
East Garner Elementary
Wilburn Elementary
65.6%
66.1%
66.2%
70.6%
70.8%
71.1%
71.7%
73.7%
74.6%
76.9%


Top 10 Total Free and Reduced Lunch
Rolesville High
Southeast Raleigh High
Knightdale High
South Garner High
East Garner Middle
River Bend Middle School
Athens Drive High
East Wake High
Millbrook High
Garner High
0
200
400
600
800

2 Exploratory Analysis on Social Vulnerability Measures of Locations of Green Chair Clients

The CDC Social Vulnerability Index (SVI) is a collection of social vulnerability measures for each census tract. We merged the CDC SVIs into the zip codes of the TGCP clients.

2.1 Gathering some initial descriptive statistics on the numerical data

```
##                     vars    n     mean       sd   median  trimmed      mad
## Id                     1 5448 35417.06 10733.98 38435.50 38435.50  2019.30
## Veteran                2 5448     0.06     0.24     0.00     0.00     0.00
## Incarcerated           3 5448     0.03     0.18     0.00     0.00     0.00
## Disability             4 5448     0.05     0.22     0.00     0.00     0.00
## AnnualIncomeAmount     5 3493 13246.58 28104.24 10140.00 11488.37 12898.62
## TotalHHNumber          6 5332     3.10     2.55     3.00     2.82     1.48
## NumAdultFemales        7 3923     1.05     0.76     1.00     1.00     0.00
## NumAdultMales          8 3037     0.79     0.96     1.00     0.70     0.00
## NumChildren            9 3896     2.16     1.49     2.00     2.05     1.48
## QueenBeds             10 1534     0.19     0.40     0.00     0.10     0.00
## Cribs                 11 1535     0.24     0.47     0.00     0.16     0.00
## TwinBeds              12 2326     1.07     1.32     1.00     0.86     1.48
## AREA_SQMI             13 4793     5.87    11.99     4.57     4.30     2.75
## EP_POV                14 4793    16.68     7.21    16.27    16.60     8.43
## EP_UNEMP              15 4793     5.72     2.08     5.12     5.57     1.78
## EP_PCI                16 4793 30847.33  9701.99 27931.25 29386.65  8080.87
## EP_NOHSDP             17 4793    11.87     4.94    11.83    12.09     6.68
## EP_AGE65              18 4793    10.45     2.97     9.24    10.06     1.33
## EP_AGE17              19 4793    23.15     4.70    23.70    23.63     5.23
## EP_DISABL             20 4793    10.34     2.58    10.35    10.38     3.65
## EP_SNGPNT             21 4793    11.60     4.15    11.77    11.69     5.86
## EP_MINRTY             22 4793    53.96    21.21    60.77    54.59    30.64
## EP_LIMENG             23 4793     3.54     1.97     3.52     3.42     2.04
## EP_MUNIT              24 4793    15.07     8.99    12.13    14.46     7.42
## EP_MOBILE             25 4793     4.54     4.21     4.30     3.89     3.14
## EP_CROWD              26 4793     3.21     1.43     2.85     3.27     1.64
## EP_NOVEH              27 4793     7.02     4.59     6.41     6.27     4.04
## EP_GROUPQ             28 4793     4.24     6.30     2.44     2.70     2.51
## EP_UNINSUR            29 4793    12.85     4.16    14.00    13.20     4.00
## totalBedNeeded        30 5448     0.31     0.85     0.00     0.06     0.00
##                        min        max      range  skew kurtosis     se
## Id                  509.00   41360.00   40851.00 -2.86     6.39 145.43
## Veteran               0.00       1.00       1.00  3.72    11.87   0.00
## Incarcerated          0.00       1.00       1.00  5.07    23.70   0.00
## Disability            0.00       1.00       1.00  4.17    15.37   0.00
## AnnualIncomeAmount    0.00 1500000.00 1500000.00 42.83  2242.63 475.52
## TotalHHNumber         0.00      60.00      60.00 10.84   231.77   0.03
## NumAdultFemales       0.00      10.00      10.00  5.30    48.39   0.01
## NumAdultMales         0.00      17.00      17.00  5.51    55.19   0.02
## NumChildren           0.00      12.00      12.00  0.96     1.78   0.02
## QueenBeds             0.00       3.00       3.00  1.97     3.25   0.01
## Cribs                 0.00       2.00       2.00  1.71     2.00   0.01
## TwinBeds              0.00       7.00       7.00  1.17     0.82   0.03
```

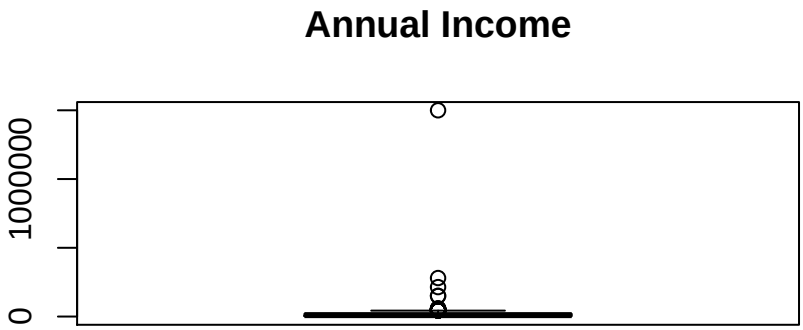
```
## AREA_SQMI              0.62     612.33     611.72 30.23  1405.53   0.17
## EP_POV                 2.88      34.33      31.45  0.12    -0.66   0.10
## EP_UNEMP               1.43      15.75      14.32  0.77     0.17   0.03
## EP_PCI             10868.37   73055.91   62187.54  1.31     1.72 140.14
## EP_NOHSDP              1.26      33.04      31.79 -0.14    -0.80   0.07
## EP_AGE65               6.34      34.54      28.19  1.30     2.05   0.04
## EP_AGE17               8.50      31.73      23.23 -0.72    -0.33   0.07
## EP_DISABL              4.94      28.30      23.37  0.24     1.03   0.04
## EP_SNGPNT              3.07      21.93      18.86  0.07    -1.23   0.06
## EP_MINRTY              4.08      81.43      77.36 -0.07    -1.37   0.31
## EP_LIMENG              0.10       9.32       9.22  0.53     0.27   0.03
## EP_MUNIT               0.00      49.20      49.20  0.87     0.73   0.13
## EP_MOBILE              0.14      46.79      46.65  3.02    15.85   0.06
## EP_CROWD               0.00       6.11       6.11 -0.09    -1.26   0.02
## EP_NOVEH               1.10      22.54      21.44  1.69     2.93   0.07
## EP_GROUPQ              0.00      59.45      59.45  2.74     7.77   0.09
## EP_UNINSUR             2.64      21.45      18.81 -0.52    -0.86   0.06
## totalBedNeeded         0.00       6.00       6.00  3.11     9.90   0.01
```

Some things worth noting about SVI statistics of where clients live:

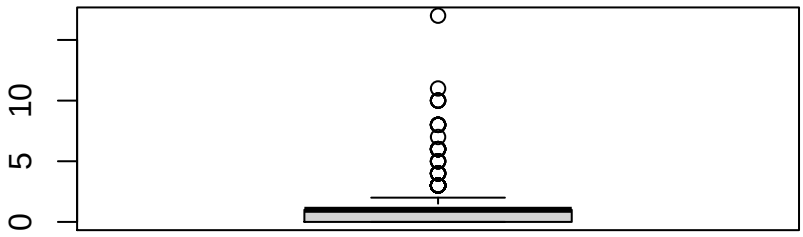
- Percent Poverty averages about 17%, but Percent Unemployment averages only about 5-6%
- About 12% have no high school diploma
- About 12% are single parents
- About 10% have a disability
- Average percent minority is over half
- About a 23% are seventeen or younger
- On average, about 15% live in housing structures with more than 10 units per structure
- About 7% do not have a vehicle
- About 13% do not possess insurance

Some things worth noting about clients:

- Annual Income is right skewed; most annual incomes are small with a few large outliers



- NumAdultMale is slightly left skewed; most households have about one adult male but a lot of outliers with none



2.2 Some correlation statistics:

- NumChildren negatively correlated with SVI measures of poverty, living in apartment-like structures, and not having a vehicle

  Correlations with NumChildren

```
##                 Id           Veteran      Incarcerated        Disability
##        0.088100978       -0.120384533      -0.194359942      -0.402893253
## AnnualIncomeAmount      TotalHHNumber   NumAdultFemales      NumAdultMales
##        0.087791712        0.941992816       0.381053590      -0.171283519
##        NumChildren          QueenBeds             Cribs          TwinBeds
##        1.000000000       -0.342336131       0.346127362       0.675141095
##          AREA_SQMI             EP_POV          EP_UNEMP             EP_PCI
##        0.162085383       -0.155583619       0.017041767      -0.027899576
##          EP_NOHSDP           EP_AGE65          EP_AGE17          EP_DISABL
##       -0.001103489        0.080111985       0.194707874       0.097252026
##          EP_SNGPNT           EP_MINRTY          EP_LIMENG           EP_MUNIT
##        0.044247983        0.003053117      -0.071385536      -0.226939703
##          EP_MOBILE           EP_CROWD          EP_NOVEH          EP_GROUPQ
##        0.179560159       -0.032375529      -0.158472473      -0.119809180
##         EP_UNINSUR     totalBedNeeded
##       -0.022357626        0.532777889
```

- We see that a need for queen beds is positively correlated with those incarcerated and especially those with a disability. Need for queen beds is also slightly positively correlated with SVI measures of poverty and not having a vehicle

  Correlations with QueenBeds

```
##                 Id           Veteran      Incarcerated        Disability
##       -0.041088404        0.065833132       0.125049115       0.318662827
## AnnualIncomeAmount      TotalHHNumber   NumAdultFemales      NumAdultMales
##       -0.123166197       -0.349047273      -0.259406932       0.141297825
##        NumChildren          QueenBeds             Cribs          TwinBeds
##       -0.342336131        1.000000000      -0.184143488      -0.243592911
##          AREA_SQMI             EP_POV          EP_UNEMP             EP_PCI
##       -0.062729793        0.156332307       0.028647202      -0.078647594
##          EP_NOHSDP           EP_AGE65          EP_AGE17          EP_DISABL
##        0.062296986       -0.103019846      -0.093494622      -0.005538143
##          EP_SNGPNT           EP_MINRTY          EP_LIMENG           EP_MUNIT
##        0.014202936        0.050345741       0.086509129       0.080775081
##          EP_MOBILE           EP_CROWD          EP_NOVEH          EP_GROUPQ
##       -0.051837563        0.088620027       0.096149706       0.058209794
```

```
##         EP_UNINSUR     totalBedNeeded
##        0.060873471       -0.198013697
```

- Need for twin beds is slightly positively correlated with SVI measures of percent of population aged less than or equal to 17, and percent of population living in mobile homes (in fact, the need for beds in general is correlated with these SVI measures)

  Correlations with TwinBeds

```
##                 Id            Veteran       Incarcerated         Disability
##        0.051602714       -0.094427391       -0.114955764       -0.289451406
## AnnualIncomeAmount      TotalHHNumber    NumAdultFemales      NumAdultMales
##        0.196108599        0.664869170        0.307454925       -0.147670269
##        NumChildren          QueenBeds              Cribs          TwinBeds
##        0.675141095       -0.243592911       -0.013705872        1.000000000
##          AREA_SQMI             EP_POV           EP_UNEMP             EP_PCI
##        0.172649764       -0.106965549        0.040593093       -0.029623810
##          EP_NOHSDP          EP_AGE65           EP_AGE17          EP_DISABL
##        0.005692942        0.052686064        0.162381056        0.093537920
##          EP_SNGPNT          EP_MINRTY          EP_LIMENG           EP_MUNIT
##        0.041055912        0.010695178       -0.071210977       -0.183301980
##          EP_MOBILE           EP_CROWD           EP_NOVEH          EP_GROUPQ
##        0.149448032       -0.006169949       -0.105790148       -0.084840753
##         EP_UNINSUR     totalBedNeeded
##       -0.021351609        0.655735893
```

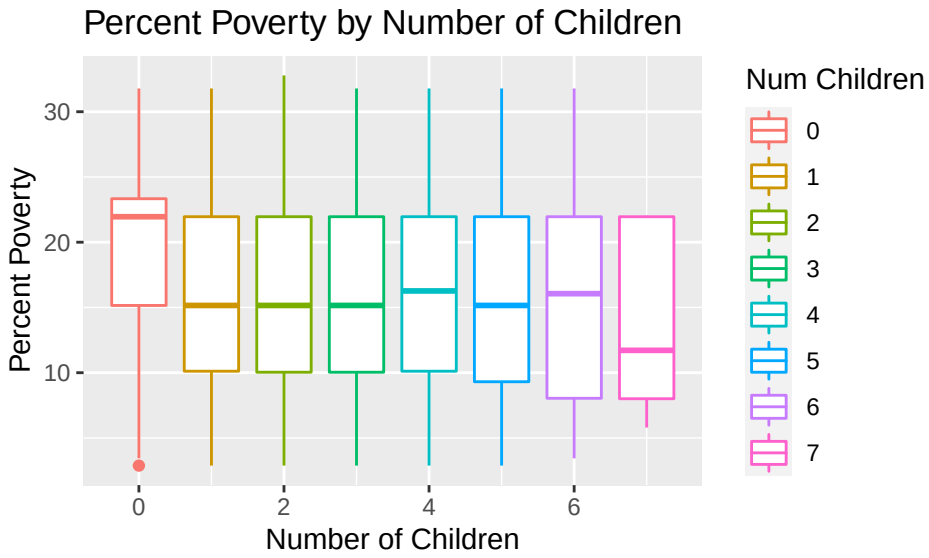
- We see some of the largest correlation values with Disability, i.e.
  - SVI measures of poverty, no high school diploma, speaking English "less than well", living in apartment-like structures and crowded environments, having no vehicle, and not being insured

However, it is worth noting that SVI statistics may look at a population different from that of TGCP clients. For instance, the correlation between those with a disability among the clients in the original dataset and the percent of population in the client's zipcode with a disability is quite small.

`Correlations with Disability`

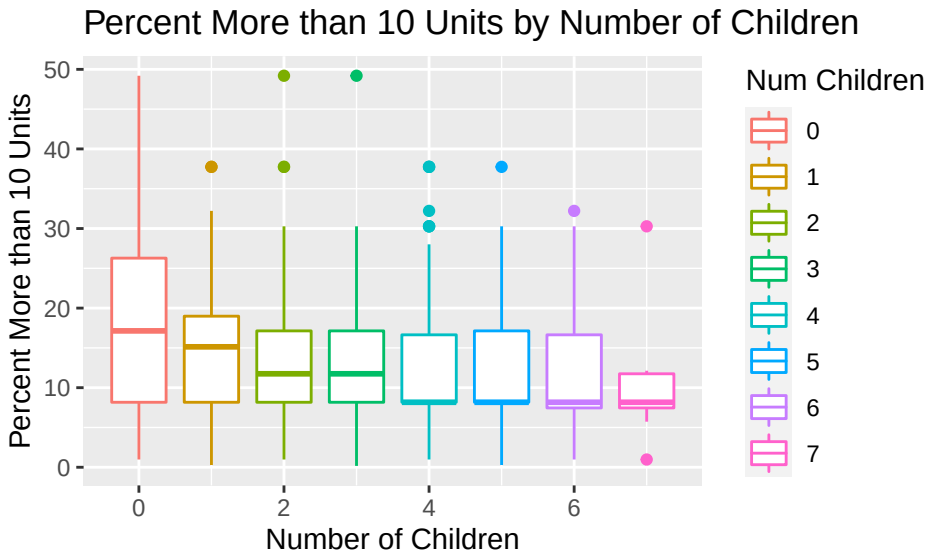
```
##                 Id            Veteran       Incarcerated         Disability
##        -0.09857245         0.15752888         0.22783623         1.00000000
## AnnualIncomeAmount      TotalHHNumber    NumAdultFemales      NumAdultMales
##        -0.08877691        -0.40423868        -0.33484527         0.19405214
##        NumChildren          QueenBeds              Cribs          TwinBeds
##        -0.40289325         0.31866283        -0.23848150        -0.28945141
##          AREA_SQMI             EP_POV           EP_UNEMP             EP_PCI
##        -0.07673890         0.18183079         0.05490866        -0.05674462
##          EP_NOHSDP          EP_AGE65           EP_AGE17          EP_DISABL
##         0.09120429        -0.08282131        -0.11663996        -0.00640091
##          EP_SNGPNT          EP_MINRTY          EP_LIMENG           EP_MUNIT
##         0.02323929         0.06097843         0.14217491         0.12372275
##          EP_MOBILE           EP_CROWD           EP_NOVEH          EP_GROUPQ
##        -0.09265279         0.07883842         0.17671029         0.11517297
##         EP_UNINSUR     totalBedNeeded
##         0.07972229        -0.23457432
```

2.3 Deeper Dive Into Correlated Relationships



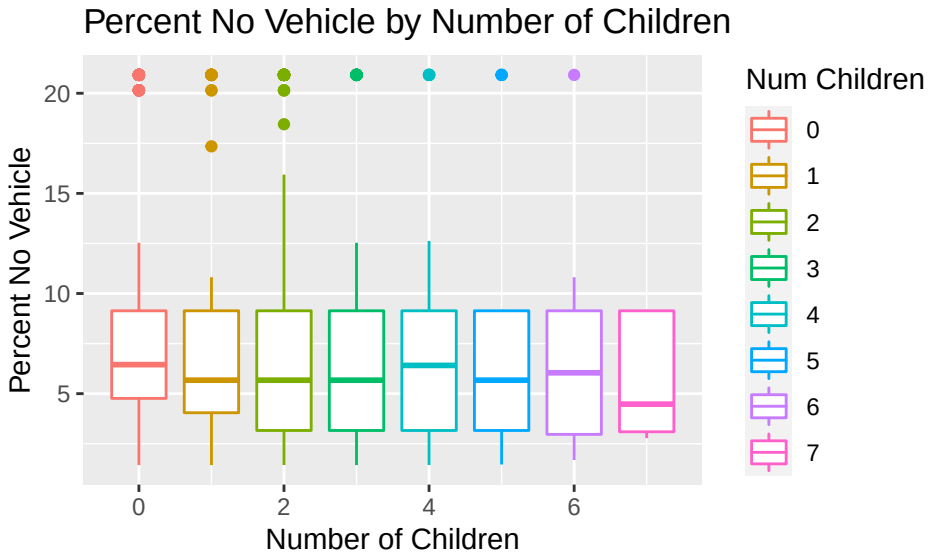
Some things to note:

- We see that the distribution among number of children is about the same
- Those with no children, however, often are within more impoverished areas



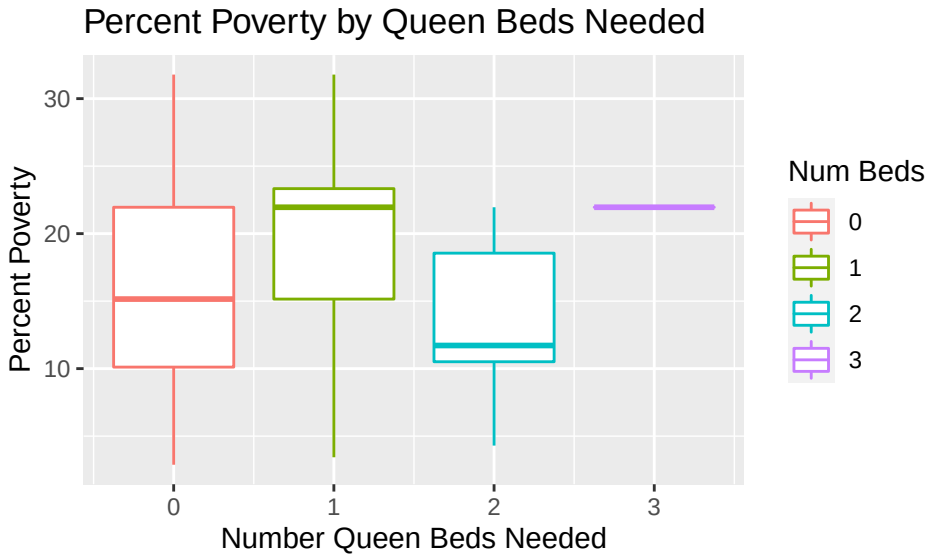
Some things to note:

- We see that the distribution among number of children varies; in general we see that having more children is associated with a smaller probability of living in a structure with more than ten housing units



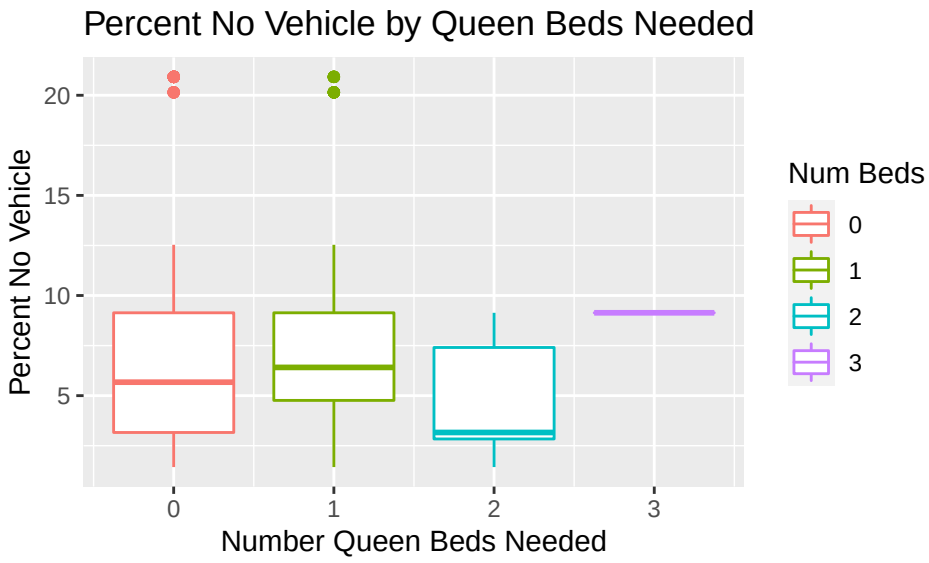
Some things to note:

- We see that the distribution among number of children is about the same
  - There are a few clients that live in areas where the probability of having no vehicle is high no matter the number of children (there are several high outliers)



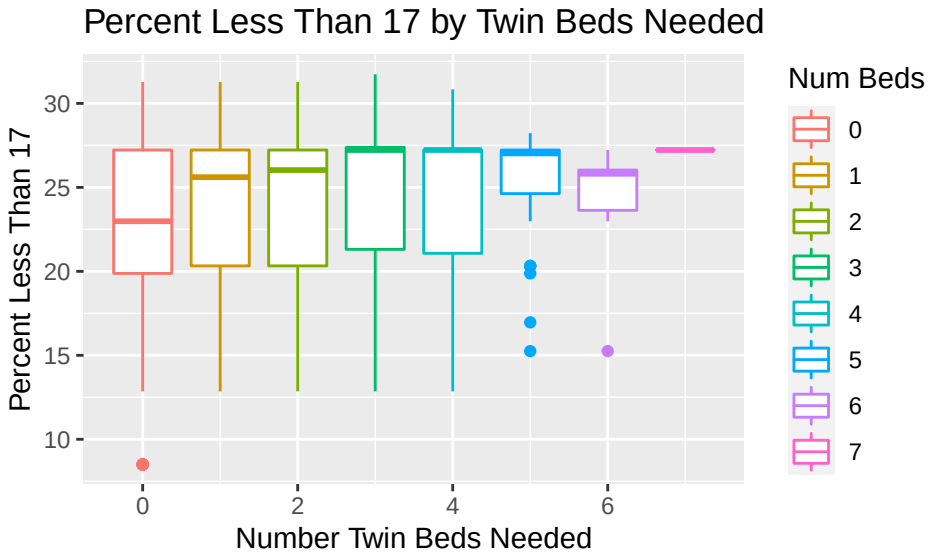
Some things to note:

- We see that that distribution among number of queen beds varies. It is worth noting that:
  - Those that need one queen bed tend to live in more impoverished areas
  - It would be worth looking into how the need for a queen bed is distributed among those with a disability



Some things to note:

- We see that that distribution among number of queen beds varies.



Some things to note:

- We see that that distribution among number of twin beds varies. It is worth noting that overall, however, that the need for twin beds increases as one tends to live in areas with more people less than 17 years of age.