

# Analysis of The Green Chair Project Client Demographics

STATCOM: Alvin Sheng, Jimmy Hickey, Naomi Giertych, Hyoshin Kim, Jake Koerner, Jiatao Wang, Sh

## Abstract

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

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# 1 Section 1

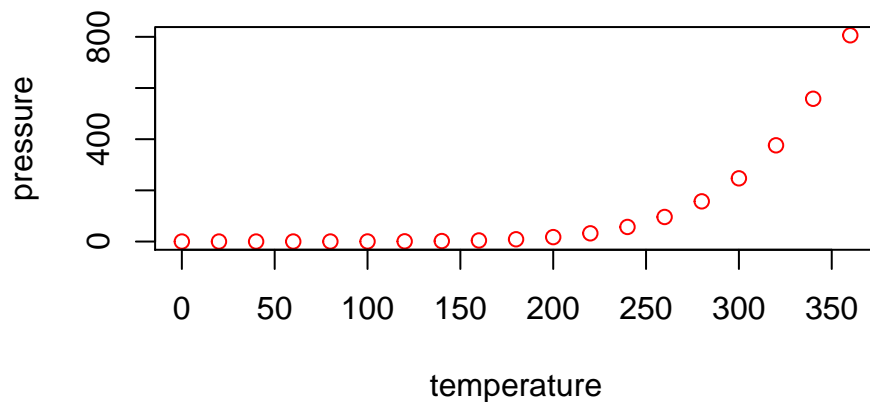
This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
##           [,1] [,2]
## [1,]      1    2
## [2,]      2    3
## [3,]      3    4
## [4,]      4    5
## [5,]      5    6
## [6,]      6    7
## [7,]      7    8
## [8,]      8    9
## [9,]      9   10
## [10,]     10   11
```

## 1.1 Including Plots 1

You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

## 2 Exploratory Analysis on Social Vulnerability Measures of Locations of Green Chair 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 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
- Most beds needed are twin beds

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 10-12% have no high school diploma
- About 10-12% are single parents
- About 10-12% have a disability
- Average percent minority is over half
- About a fifth to a fourth are seventeen or younger
- On average, about 16% live in housing structures with more than 10 units per structure
- About 7-8% do not have a vehicle
- About 13% do not possess insurance

## 2.2 Some correlation statistics:

Some interesting things to note:

- NumChildren negatively correlated with SVI measures of poverty, living in apartment-like structures, and not having a vehicle
- 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
- 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 need for beds in general is correlated with these SVI measures)
- We see some of the largest correlation values for the disability column
  - 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 among that client with a disability is quite small.

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		

#### 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		

#### 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		

#### Correlations with Disability

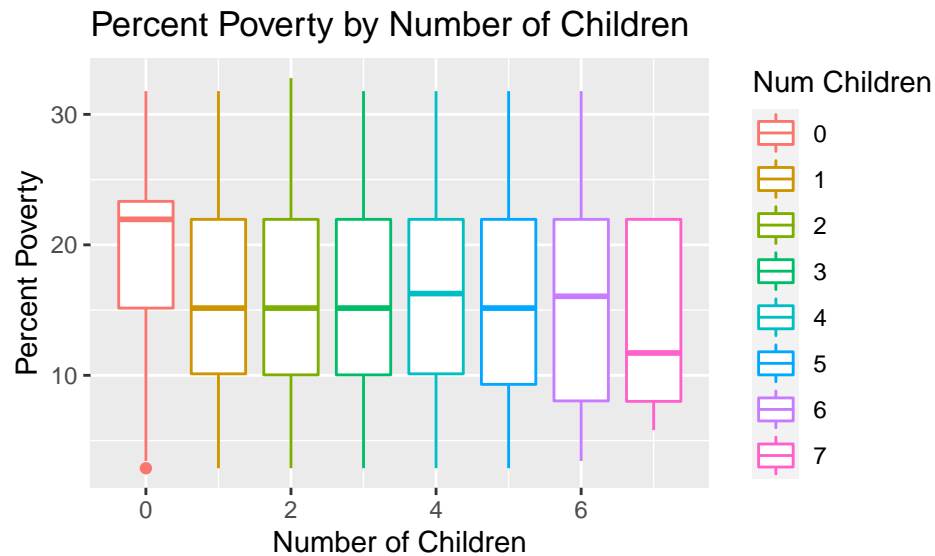
##	Id	Veteran	Incarcerated	Disability
----	----	---------	--------------	------------

```

##          -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

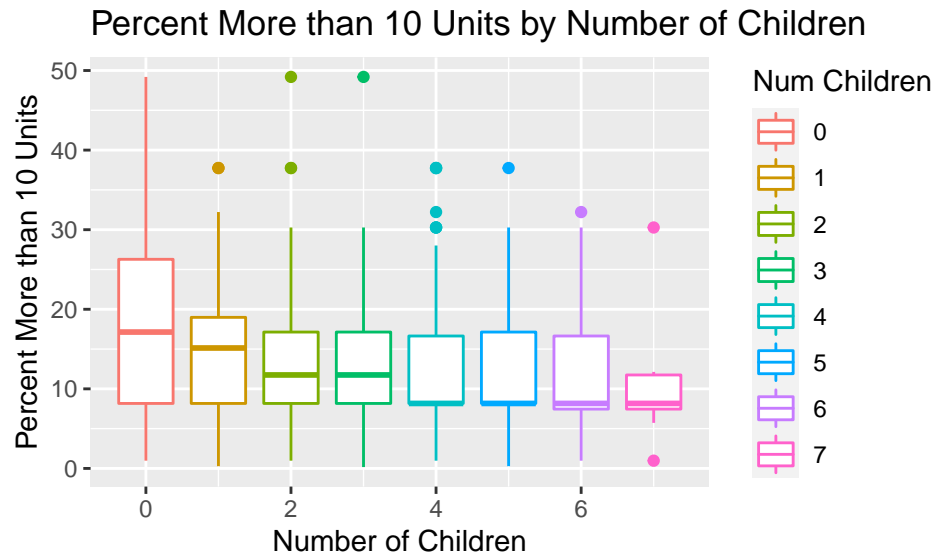
```

## 2.3 Deeper Dive Into Correlated Relationships



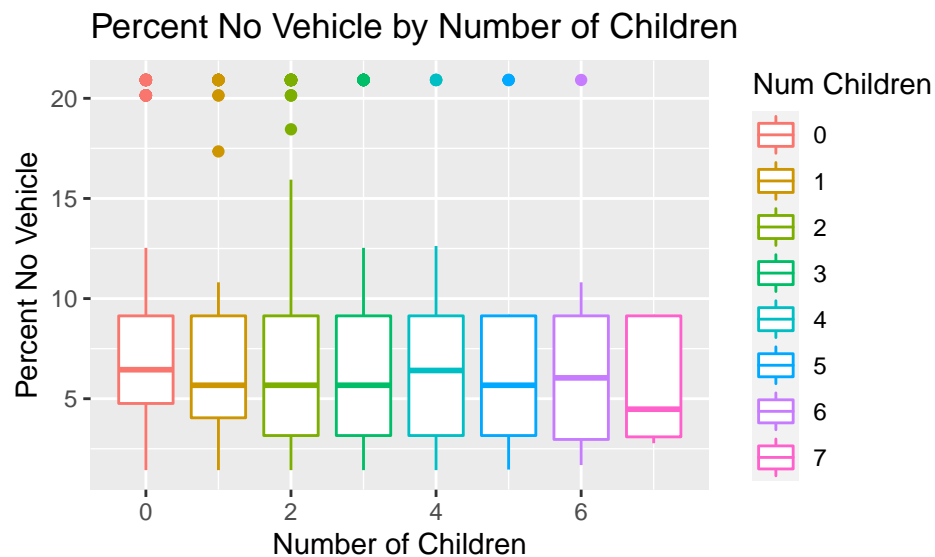
Some things to note:

- We see that that distribution among number of children is about the same for percent poverty
- Those with no children, however, often are among more impoverished areas, with a bit of a left-skew (indicating more distributed closer to more impoverished areas)



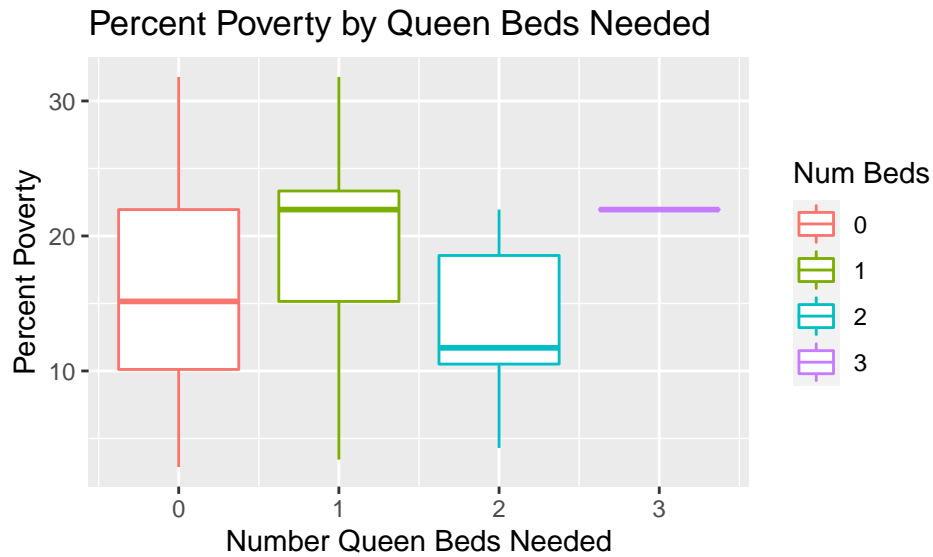
Some things to note:

- 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
  - This probability is pretty constant among after more than two kids



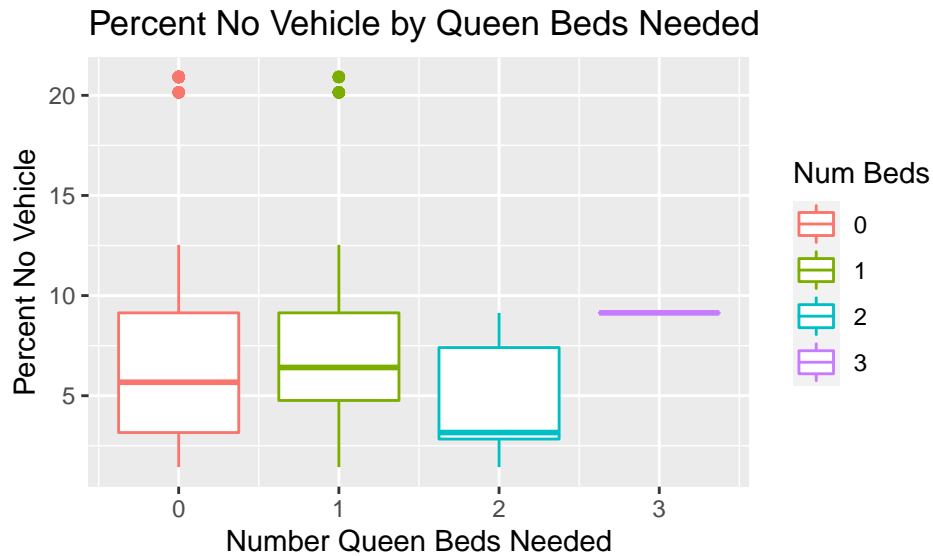
Some things to note:

- We see that that distribution among number of children is about the same, perhaps with a right skew (more towards a lower probability of having no vehicle) after the first child
  - There are a few clients that live in areas where the probability of having no vehicle is high no matter the number of children (long right tail)



Some things to note:

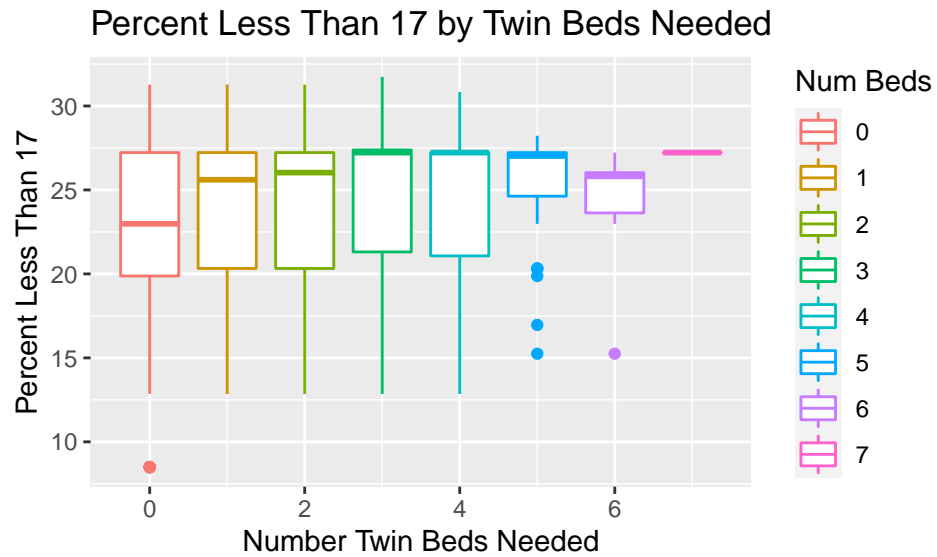
- We see that that distribution among number of queen beds varies. It is worth noting that:
  - Those that need one queen bed tend to live among more impoverished areas
  - It would be worth looking into how the need for a queen bed is distributed among those with a disability



Some things to note:

- We see that that distribution among number of queen beds varies. It is worth noting that:
  - Those that need more than one queen bed tend to live in areas where the probability of having no vehicle tends to be lower (assuming that the need for three queen beds is an outlier)
  - Again, it would be worth looking into how the need for a queen bed is distributed among those with a disability

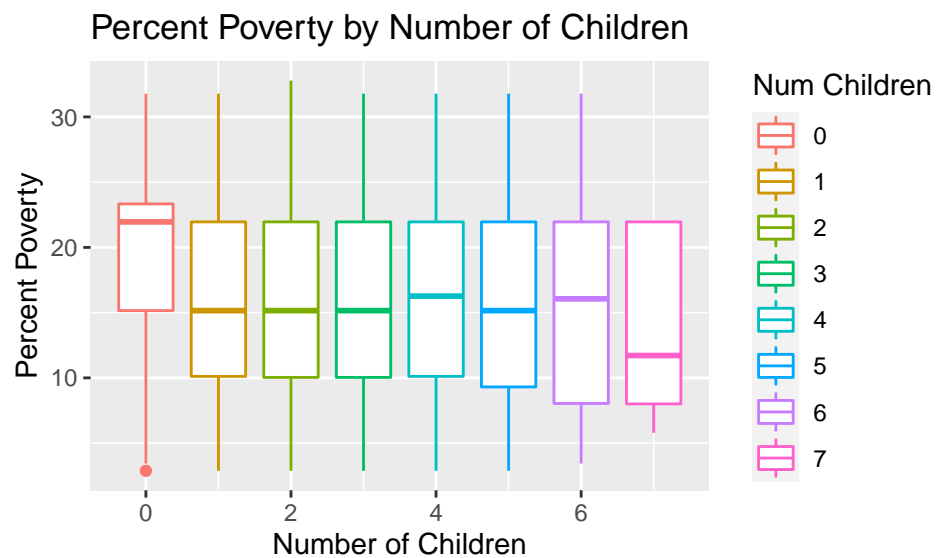




Some things to note:

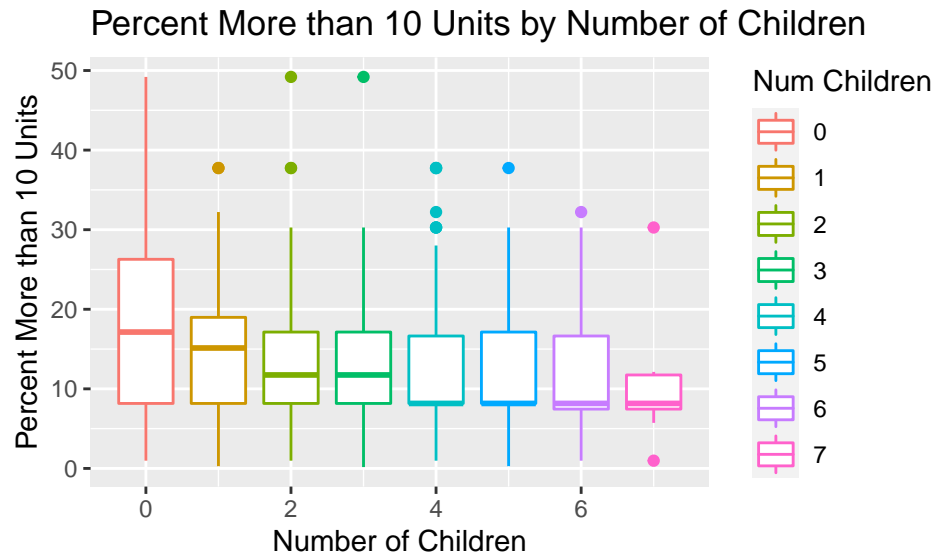
- We see that that distribution among number of twin beds varies. It is worth noting that overall, however, that the need for twin beds increases as one tends to live in areas with more people less than 17 years of age

## 2.4 Deeper Dive Into Correlated Relationships



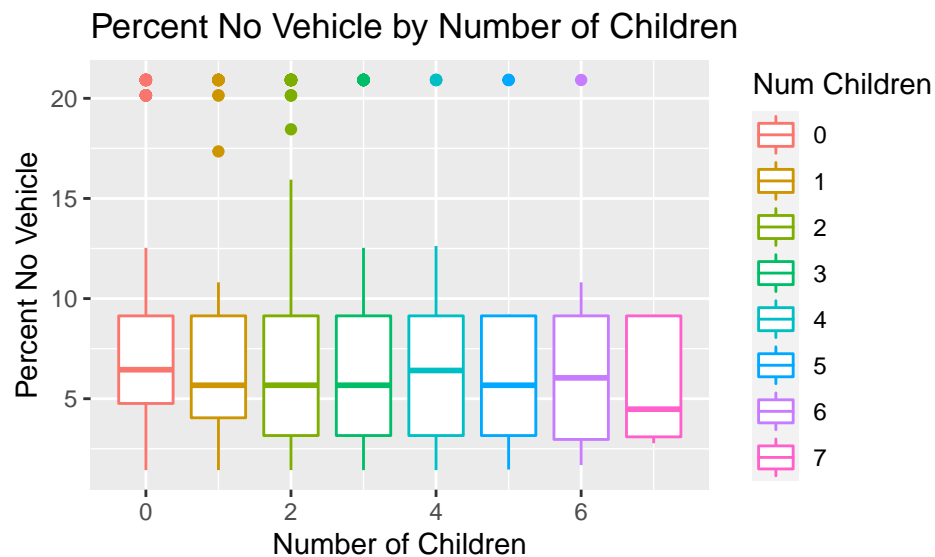
Some things to note:

- We see that that distribution among number of children is about the same for percent poverty
- Those with no children, however, often are among more impoverished areas, with a bit of a left-skew (indicating more distributed closer to more impoverished areas)



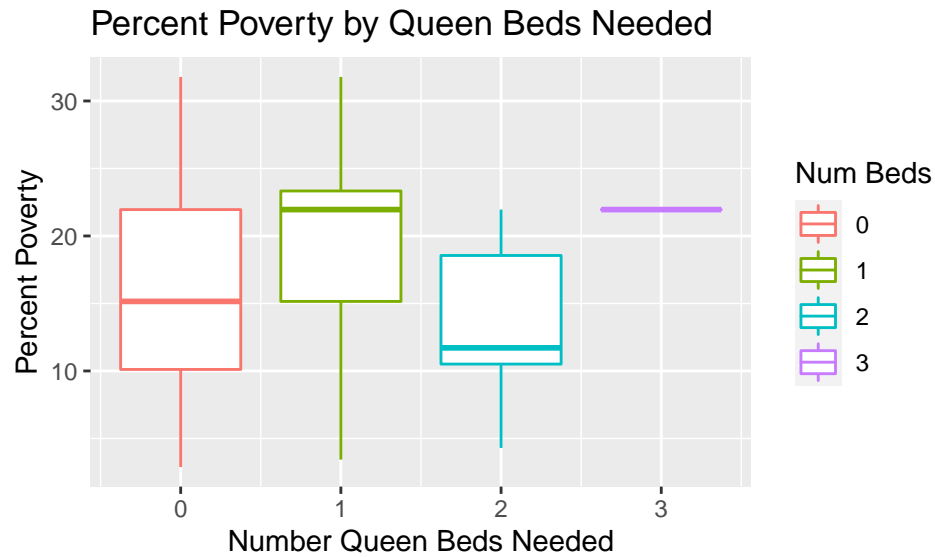
Some things to note:

- 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
  - This probability is pretty constant among after more than two kids



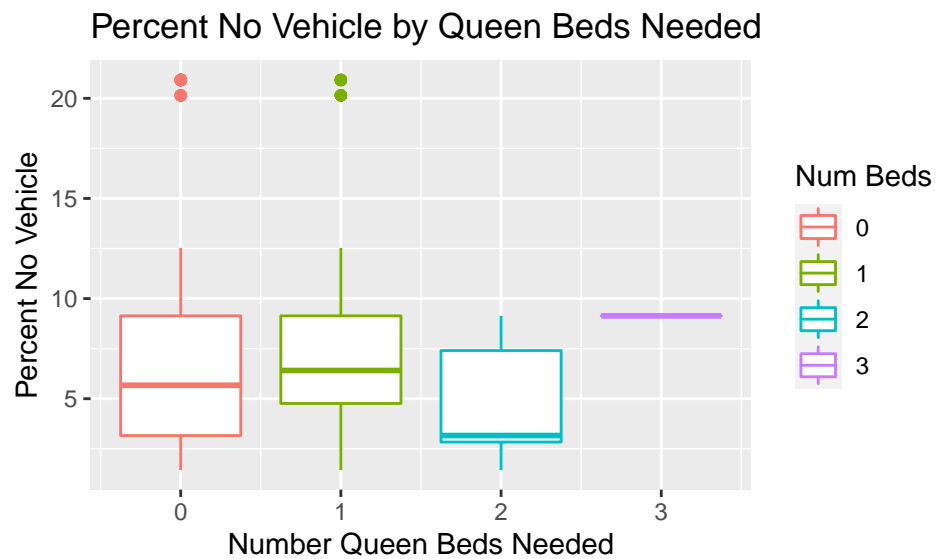
Some things to note:

- We see that that distribution among number of children is about the same, perhaps with a right skew (more towards a lower probability of having no vehicle) after the first child
  - There are a few clients that live in areas where the probability of having no vehicle is high no matter the number of children (long right tail)



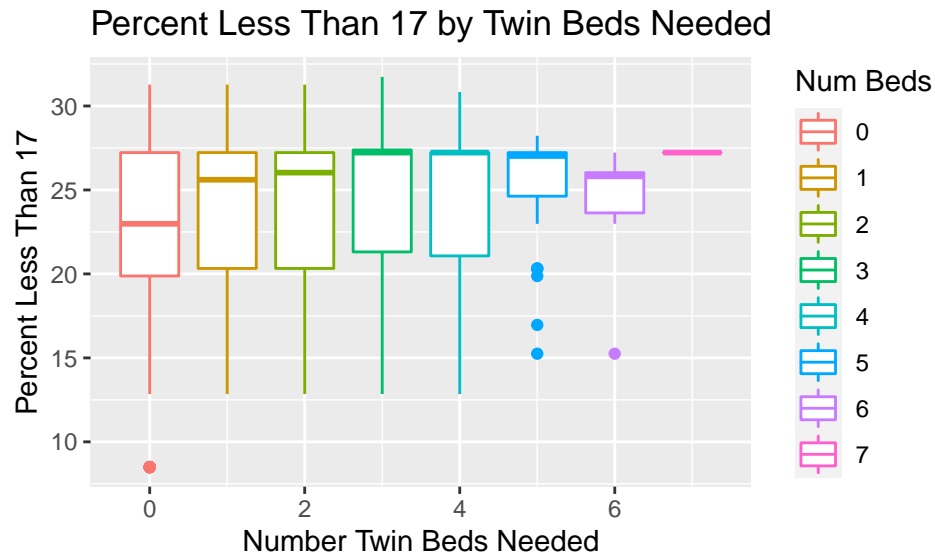
Some things to note:

- 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 among 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. It is worth noting that:
  - Those that need more than one queen bed tend to live in areas where the probability of having no vehicle tends to be lower (assuming that the need for three queen beds is an outlier)
  - Again, it would be worth looking into how the need for a queen bed is distributed among those with a disability

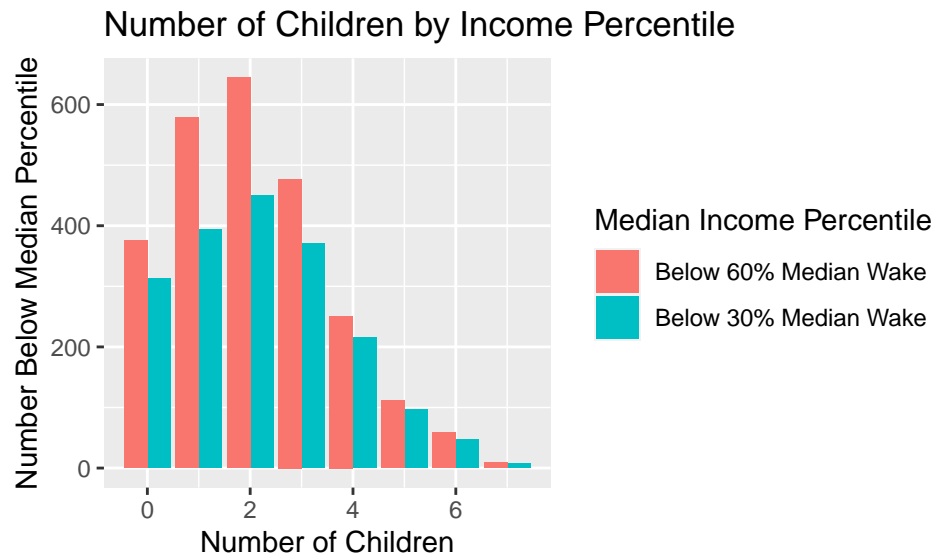


Some things to note:

- We see that that distribution among number of 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

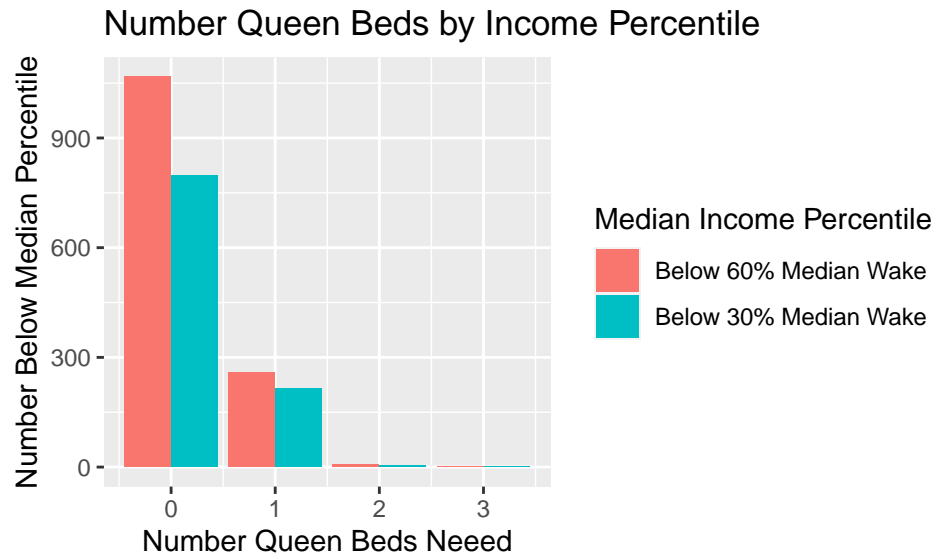
### 3 Brief Investigation Among Percent Median Income Groups

We label client as whether or not one is below the 30% or 60% median income level in Raleigh and Wake County



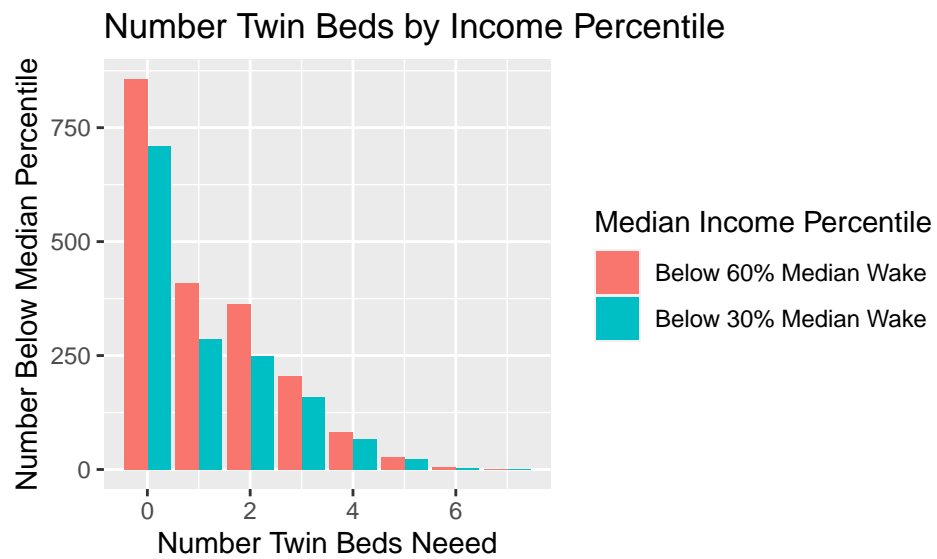
Some things to note:

- We see that the number of all of those below a certain median income level maximizes around two children, and drops of with more children
  - In other words more people living below a certain median income level when having less children



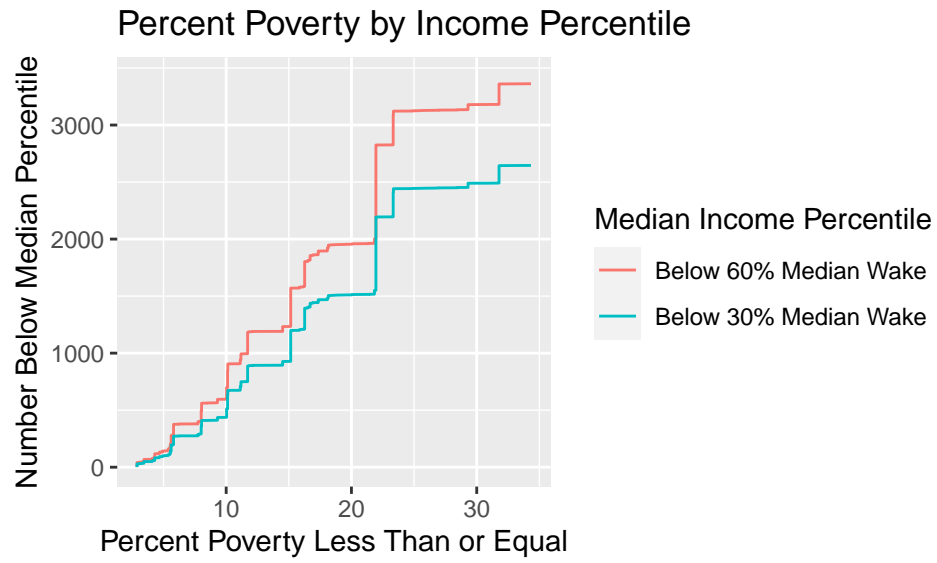
Some things to note:

- 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 accumulated at much larger steps as one's area surpasses a certain percent of impoverishment