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# Is NH Available for Youth with Mental Illness



# Introduction

## Hypothesis:

- New Hampshire overall needs to expand and further utilize its community mental health resources for individuals under eighteen because there is a lack of availability impacting granite state youth.

## What we're doing and why it matters"

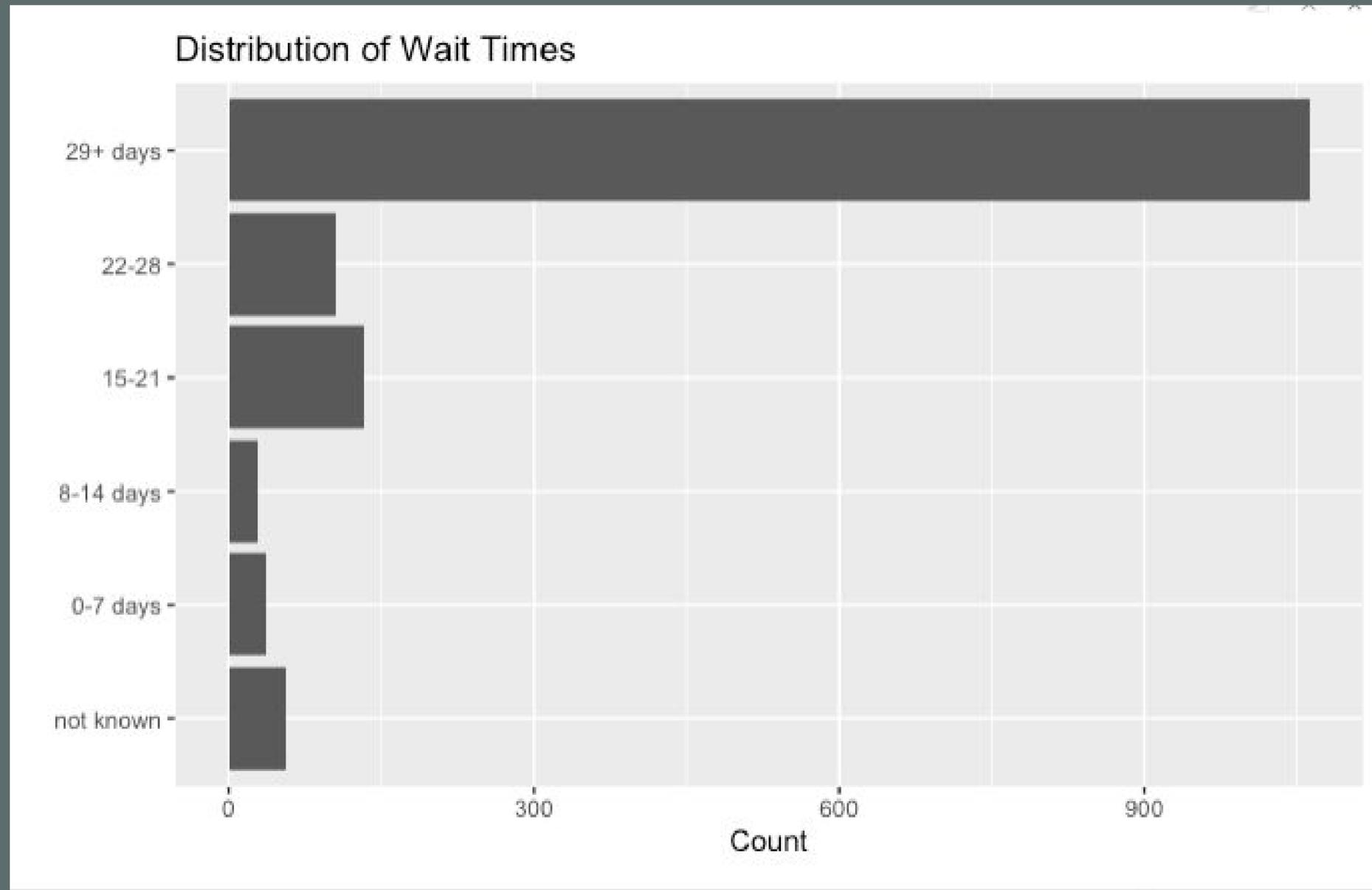
- Investigating the variables that influence wait times NH residents experience
- CMHC's
- Identifying possible disparities through demographic or specific facility information can give insight on possible reform... what needs to change?

# Data

- 2021 needs assessment from DHHS
- 2021 NH census data
- Combined in R studio

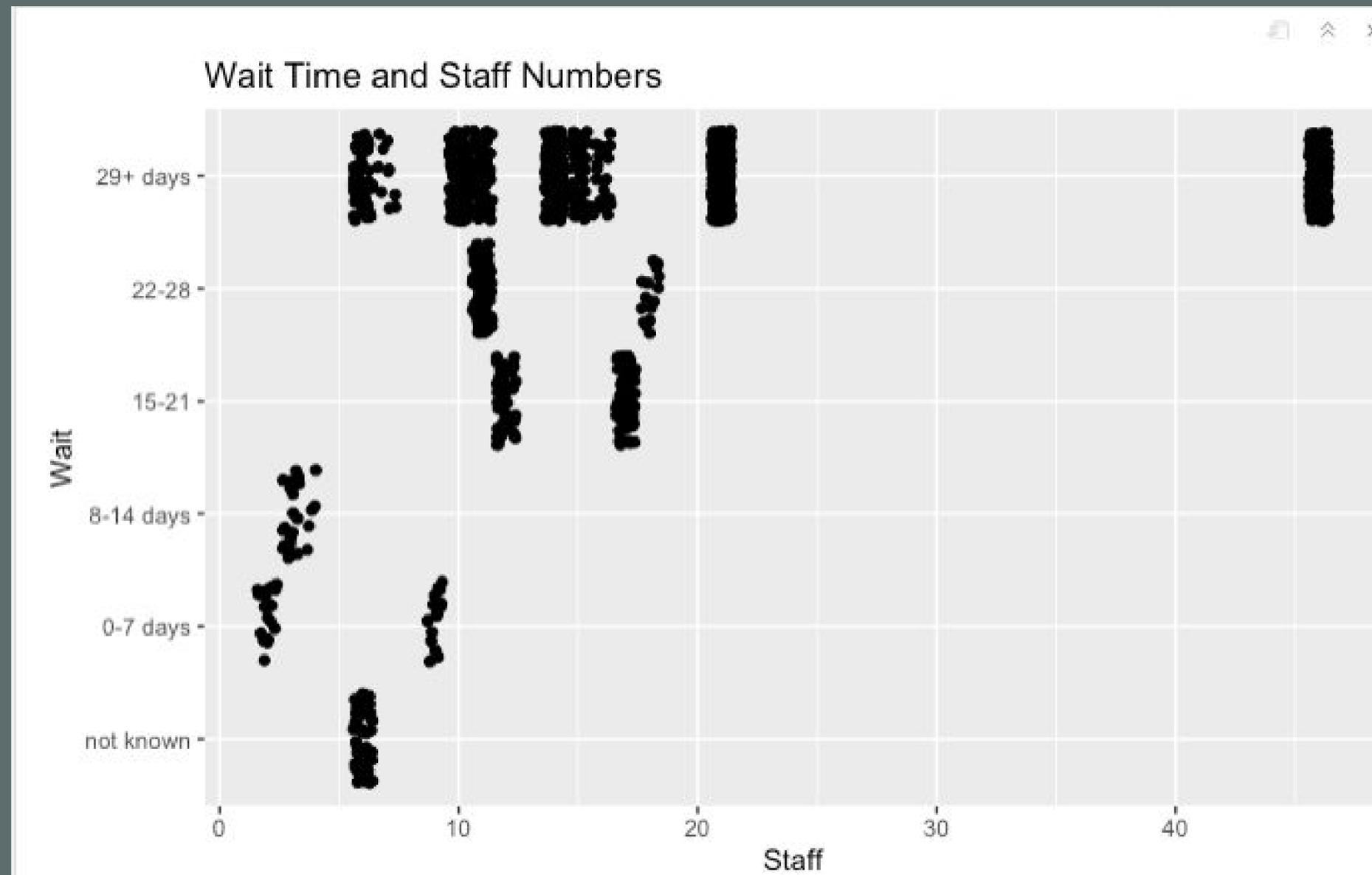
# Exploratory Data Analysis

Bar graph (geom\_bar) was made using needs assessment data from the DHHS that provides a count of how many patients waited per each period.



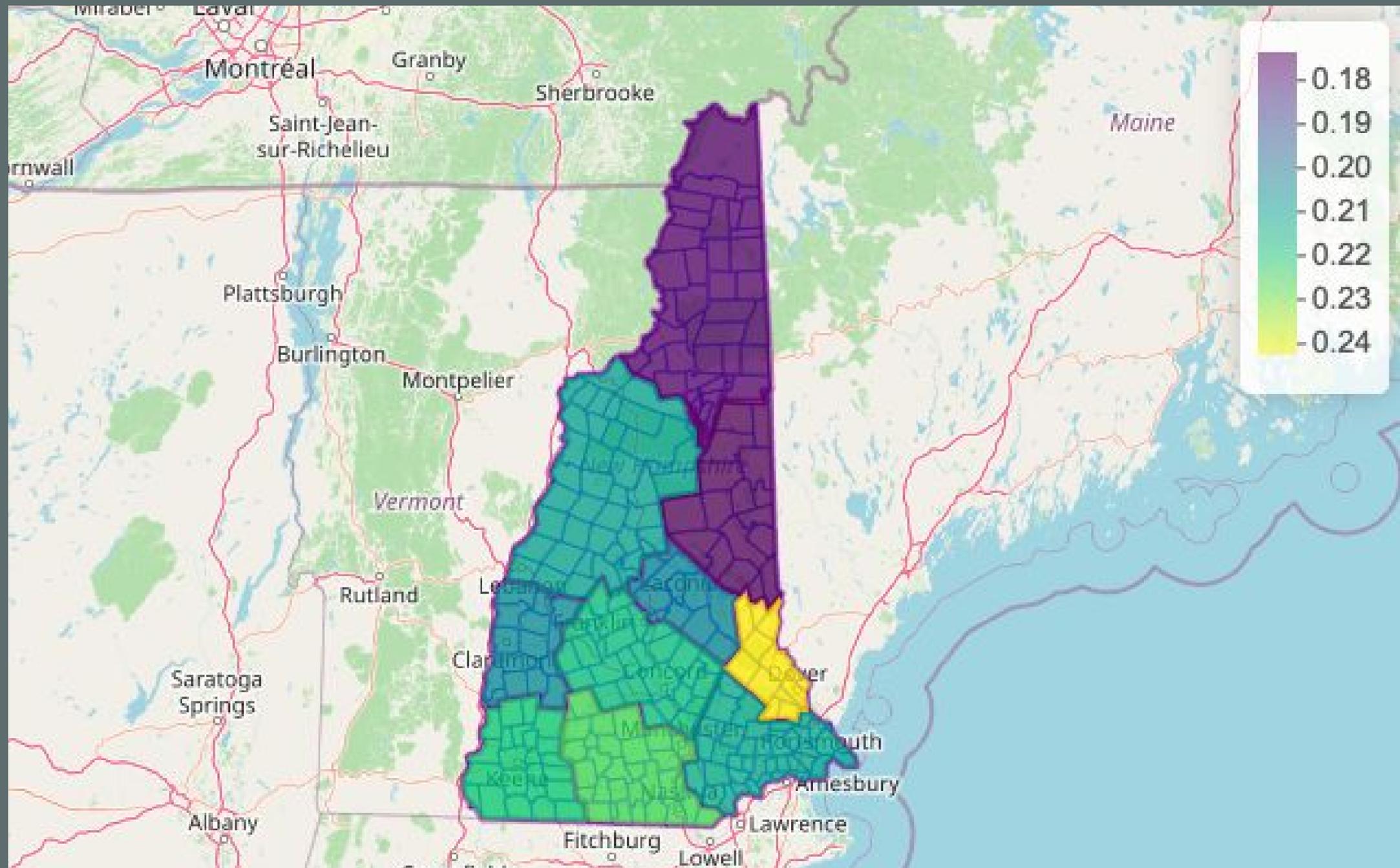
# Exploratory Data Analysis

Here `geom_jitter()` is used to plot the number of staff at each waiting period. This type of plot was used to avoid overplotting that occurred when `geom_point` was attempted.



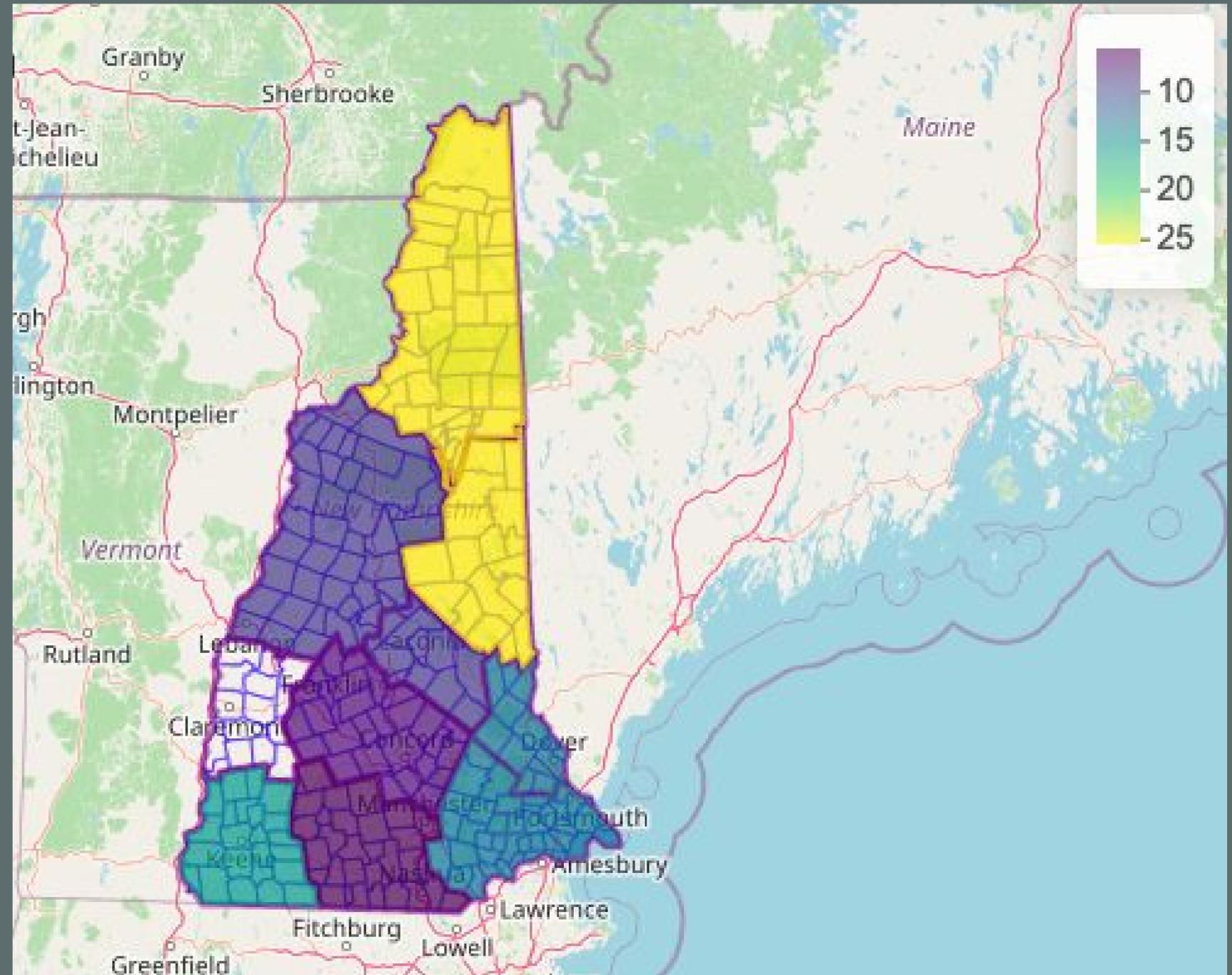
# Exploratory Data Analysis

A map was created to visualize the proportion of minors by county.



# Exploratory Data Analysis

A map was created with the number of attempts to check into Mental Health Centers per 10,000 residents in each county. Belknap and Grafton county as well as Coos and Carroll county were combined to create “super counties” because they share one mental health facility.



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# Types of Statistical Models

## Logistic Regression

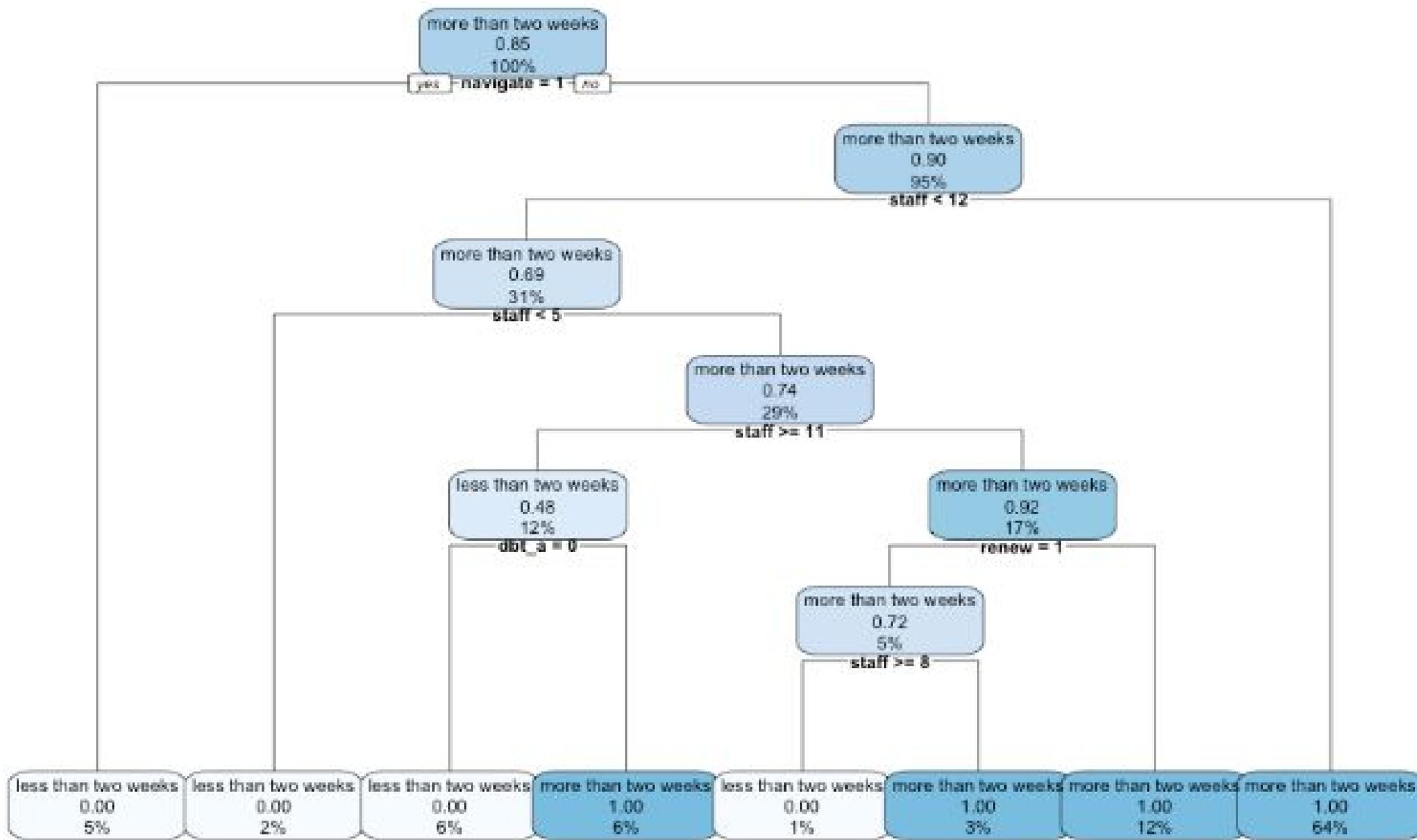
A logistic regression analysis was chosen because of its nature in predicting outcomes (or "classes"). Two classes were created: "less than two weeks" wait and "more than two weeks" wait. It uses math to find a relationship between variables.

## Decision Tree

A decision tree model was chosen to be used as well for its ability to be visualized and since missing values are not an issue. A decision tree is a sorting mechanism that is being used for predicting whether an individual will need to wait more or less than two weeks to get into a mental health facility. It makes predictions by asking "yes" or "no" questions.

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# Center Characteristic Decision Tree



Using *Staff* and *Program Type* as predictive variables

# Census Data Logistic Regression Cont.

Using the *proportion of minors with medicare or medicaid* as the predictive variable

A tibble: 2 x 3

<b>wait3</b> <chr>	<b>less than two weeks</b> <int>	<b>more than two weeks</b> <int>
less than two weeks	43	168
more than two weeks	81	1130

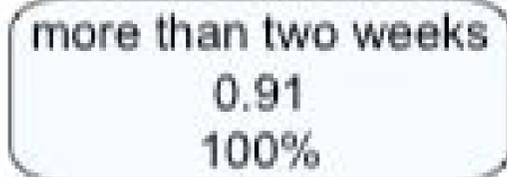
2 rows

A tibble: 10 x 4

<b>wait3</b> <chr>	<b>NAME</b> <chr>	<b>less than two weeks</b> <int>	<b>more than two weeks</b> <int>
less than two weeks	Cheshire County, New Hampshire	43	NA
less than two weeks	Hillsborough County, New Hampshire	NA	163
less than two weeks	Rockingham County, New Hampshire	NA	5
more than two weeks	Cheshire County, New Hampshire	81	NA
more than two weeks	Coos and Carroll County Combined, New Hampshire	NA	206
more than two weeks	Hillsborough County, New Hampshire	NA	76
more than two weeks	Merrimack County, New Hampshire	NA	116
more than two weeks	Rockingham County, New Hampshire	NA	413
more than two weeks	Strafford County, New Hampshire	NA	171
more than two weeks	NA	NA	148

# Census Data Decision Tree

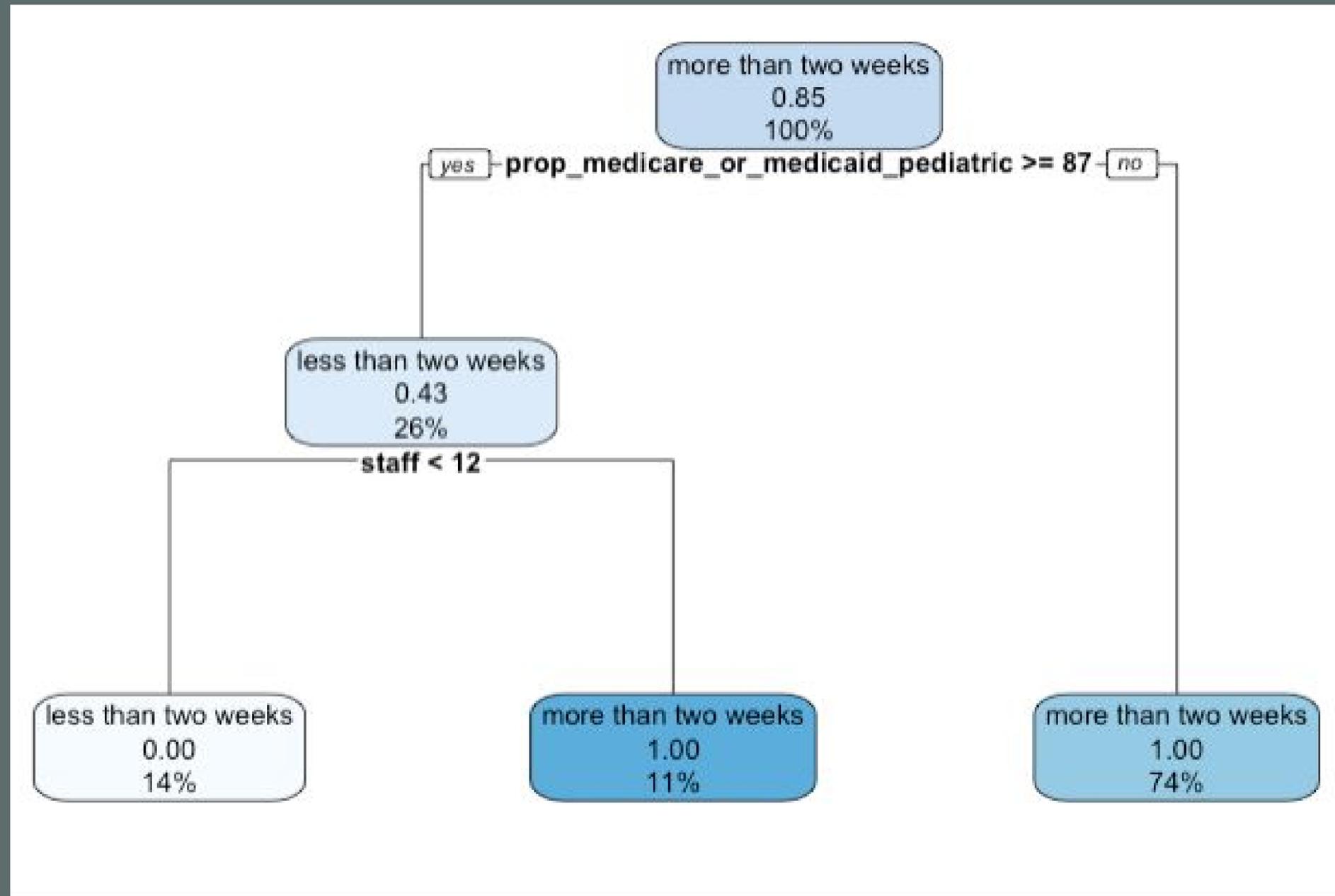
Using a *minority population*, *proportion of households 1.5 to the poverty line*, and *minors under different types of insurance* as a predictive variable then separating numbers by county



more than two weeks  
0.91  
100%

# Combined Census and Center Tree

Using *staff*, *types of programs*, the *proportion of minors with medicare or medicaid*, and *no insurance*.



This model did not end up asking questions about program type when making the tree.

# Combined Data Logistic Regression

This model used the *staff*, the *proportion of minors who are uninsured*, and *proportion of minors having medicare or medicaid* as predictive variables.

A tibble: 2 × 3

<b>wait3</b> <chr>	<b>less than two weeks</b> <int>	<b>more than two weeks</b> <int>
less than two weeks	211	NA
more than two weeks	NA	1211

2 rows

Households with under \$50k income was originally in this model but taken out because it did not have statistically significant p. value.

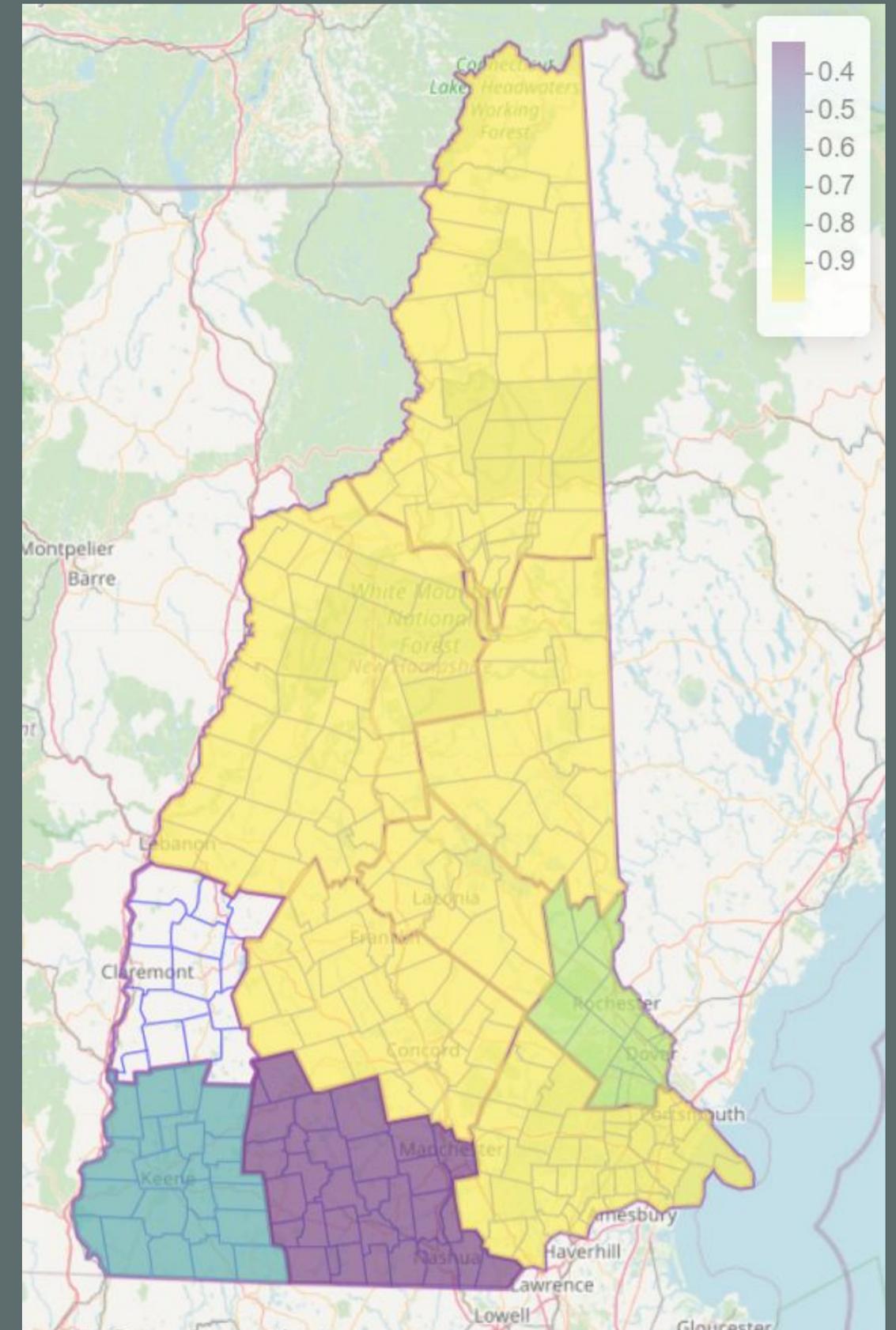
100% Accuracy!

A tibble: 10 × 4

<b>wait3</b> <chr>	<b>NAME</b> <chr>	<b>less than two weeks</b> <int>	<b>more than two weeks</b> <int>
less than two weeks	Cheshire County, New Hampshire	43	NA
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# Map

This is a map of the proportion of attempts to engage with our Mental Health Centers which result in longer than 2 week wait times by county. “Super counties” are present in this map. Additionally there was no center with service counts squarely in Sullivan County.



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# Recommendations and Conclusions

- Demographic information (race or income level) was not predictive of increased or decreased wait time.
  - Insurance and staff were predictors for a model with 100% accuracy, uninsured minors were predictive of more than two week wait periods and minors with medicare or medicaid wielded more individuals who experienced a shorter wait period. Staff numbers wielded fluctuating wait predictions, this was expected because facility size fluctuates.
  - Predominantly, more than two week waiting periods are what is experienced by the population of NH. Expansion of community mental health facilities is necessary to adequately serve individuals who need mental health care.
  - No county should share facilities, at least one per county
    - Ex. Coos and Carroll combined did not wield one patient who waited <two weeks
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Thank you!  
Questions?

