



FCS 2020 Crisis Call Analysis

DDA-3

April 13, 2021

Overview

1. The Ask
2. Data Cleaning Process
3. Data Analysis
4. Key Insights
5. Q & A



The Ask

Business Questions

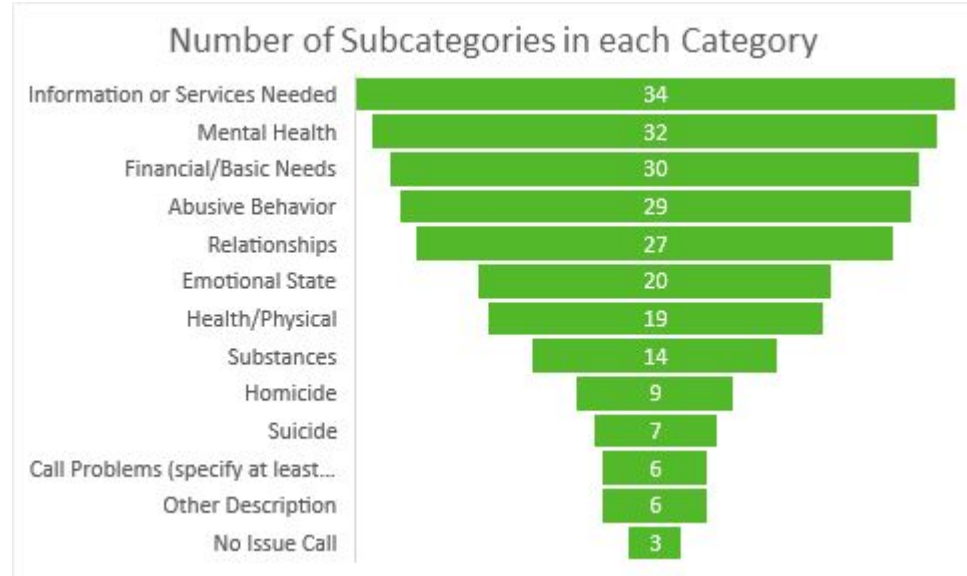
1. Examine call volume and identify surge times/seasons/events
2. Analyze trends in call content
 - a. Most common issues
 - b. Average count of issues per call
3. Assess regional and demographic trends in call content and call volume
4. Determine count and success rate of imminent risk calls
5. Identify potential savings in avoided ER visits and psychiatric treatment



Data Cleaning Process

Methodology used for data findings

- Our area of focus are the 2020 Crisis Issues columns provided by FCS.
- FCS agents select issues from categories during each call which are aggregated into columns.
- By using a string method in python, Crisis Issues columns were separated and each sub issue was set in its own respective column.
- Columns denote values of 1 when the issues were present and values of 0 when they were not.
- We added total columns for each sub issue and two columns if the calls were of Imminent Risk (IR) and how many Imminent Risk issues were present in each call.



Before:

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After:

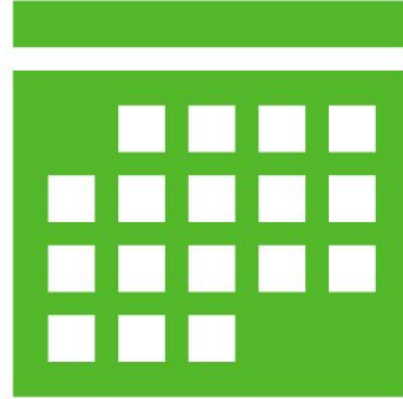
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Data Analysis

Analysis by Time

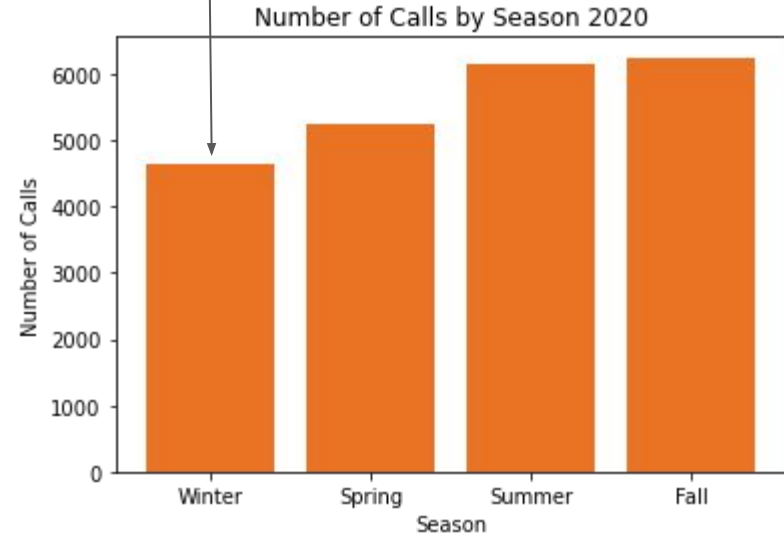
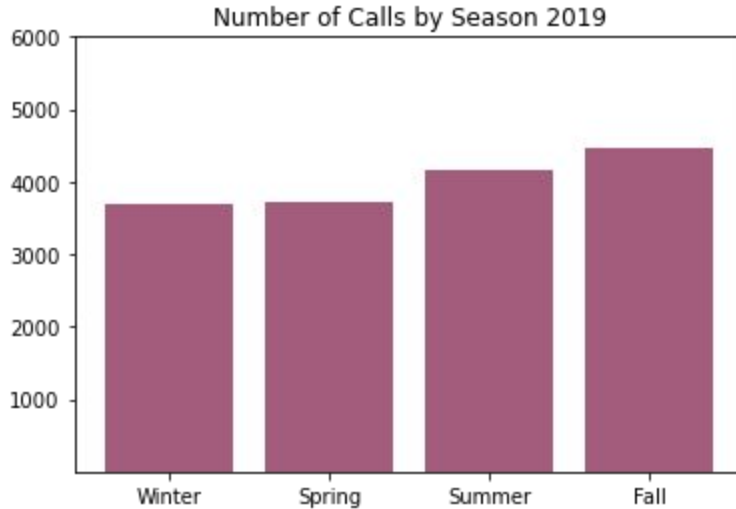
Key Considerations

- Identify peaks in call volume based on:
 - Season
 - Holidays or current events
 - Times of day
 - Days of week
- Compare 2020 call volume to 2019
- Examine imminent risk call volume



Calls by Season 2019 vs 2020

- Death of Kobe Bryant
- First US case of COVID-19
- Beginning of election year

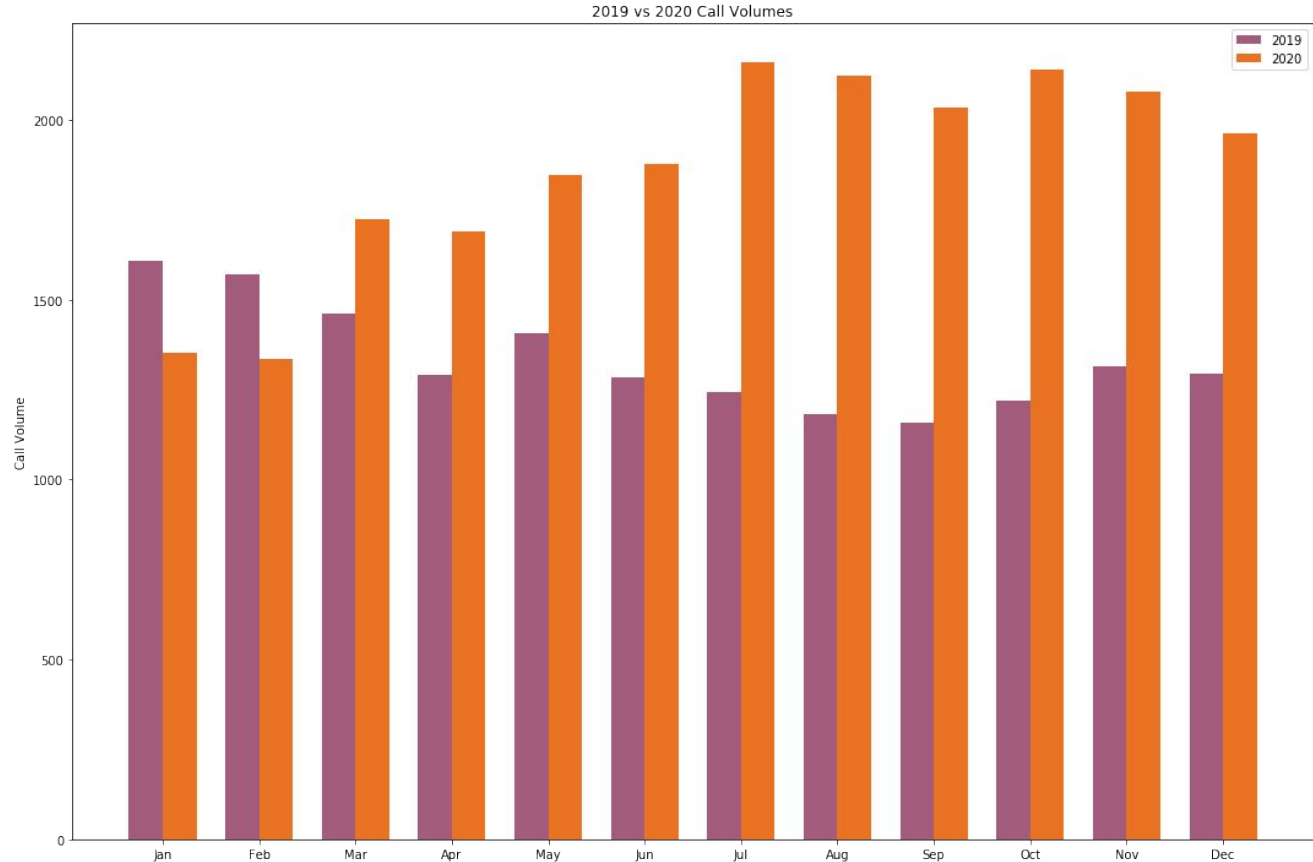


All seasons in 2020 had higher number of calls compared to 2019

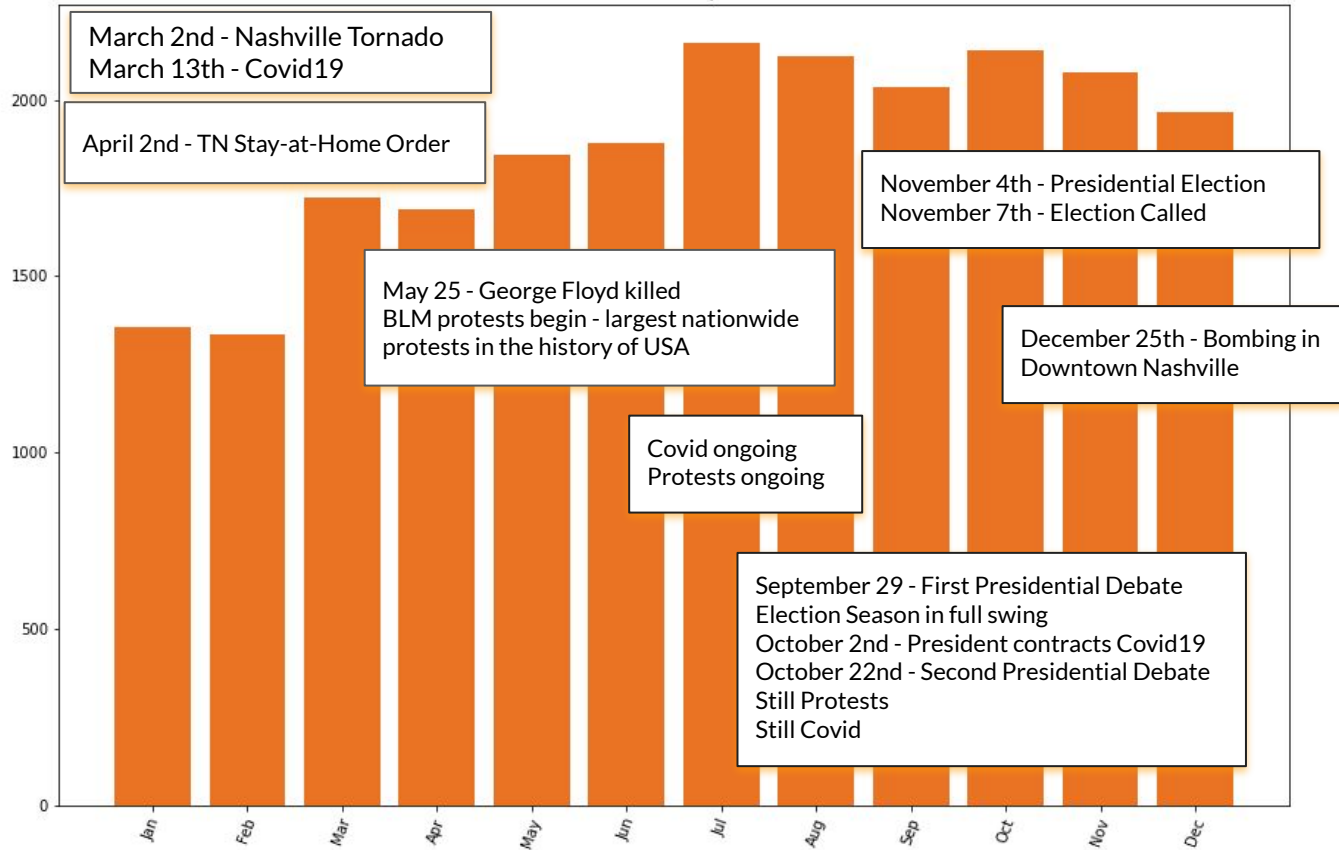
Fall 2020 had **69%** increase in calls compared to Fall 2019

Call Volume 2019 vs. 2020

- 2020 call volume greatly exceeded 2019 call volume from March through December.
- Increased call volume was not tied to discrete events, but rather increased throughout 2020 from March onward

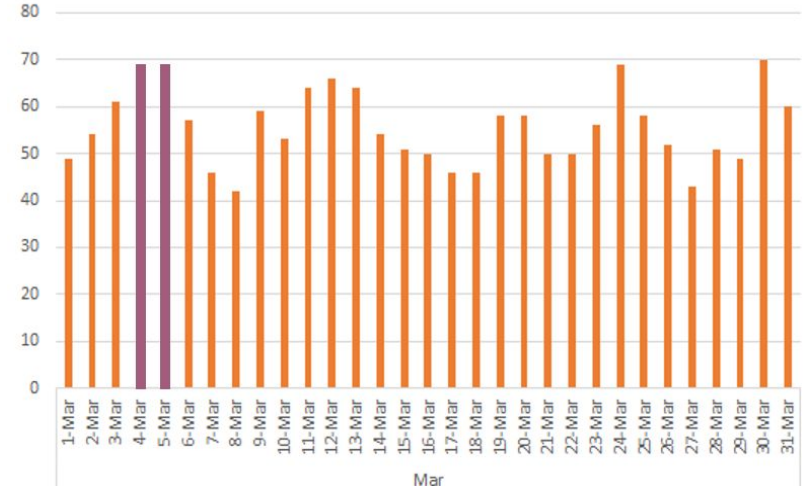


2020 Call Volume by Month

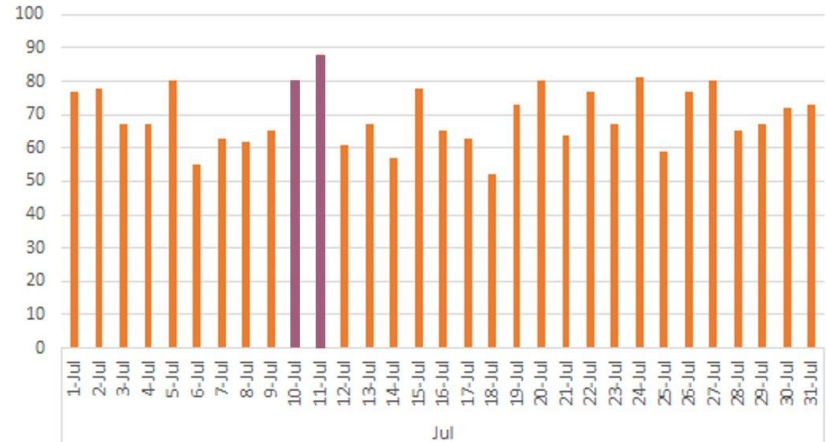


Call Volume Increase due to severe weather

Severe storms and at least one tornado on **March 2, 2020** triggers an increase in call volume between March 4th and March 5th



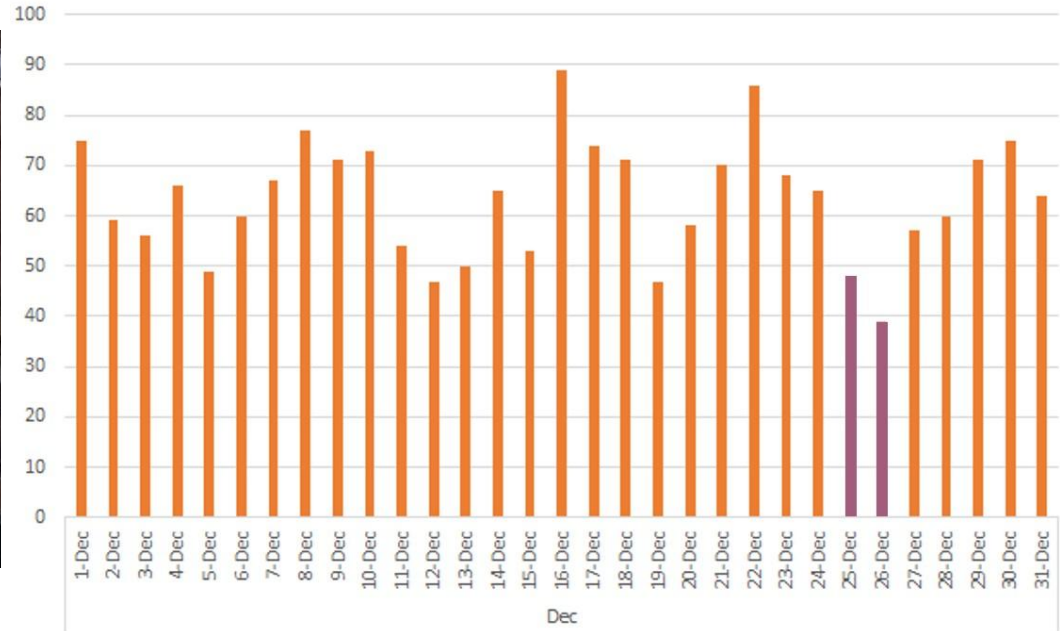
Due to severe weather impacting 20 county jurisdictions on **Friday, July 9, 2020** we see an increase in calls on July 10th and July 11th.



Call Volume decrease due loss of cell service

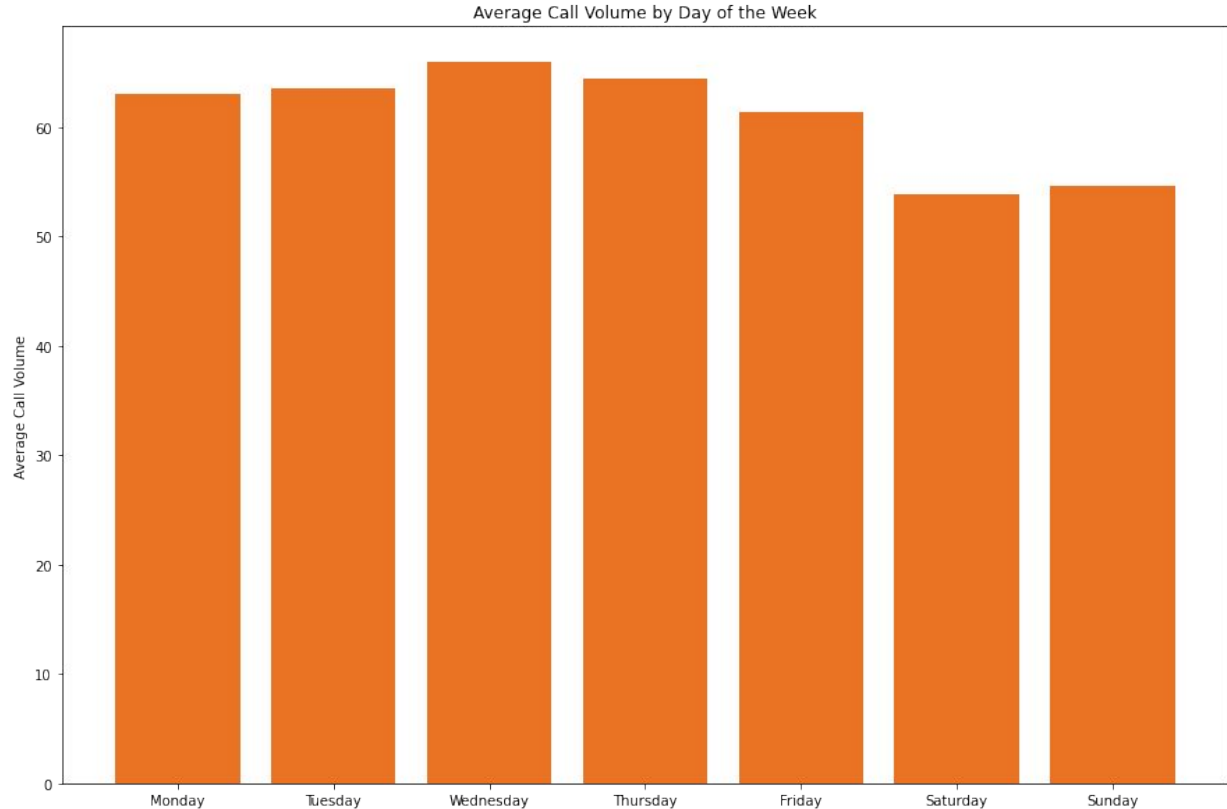
On **Friday, December 25, 2020 6:30AM** Anthony Quinn Warner detonated a vehicle bomb in downtown Nashville, Tennessee, United States, killing himself, injuring eight people and damaging dozens of buildings in the surrounding area.

It took place at 166 Second Avenue North between Church Street and Commerce Street at 6:30 am, adjacent to an AT&T network hub, resulting in days-long communication service outages.



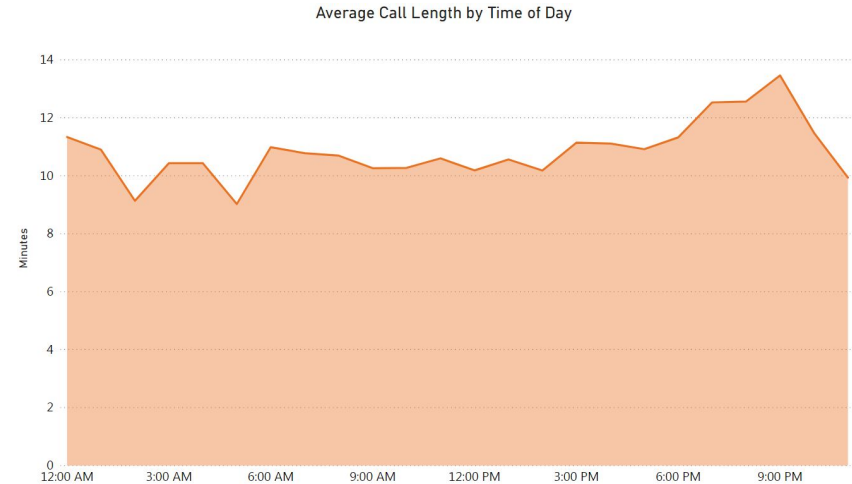
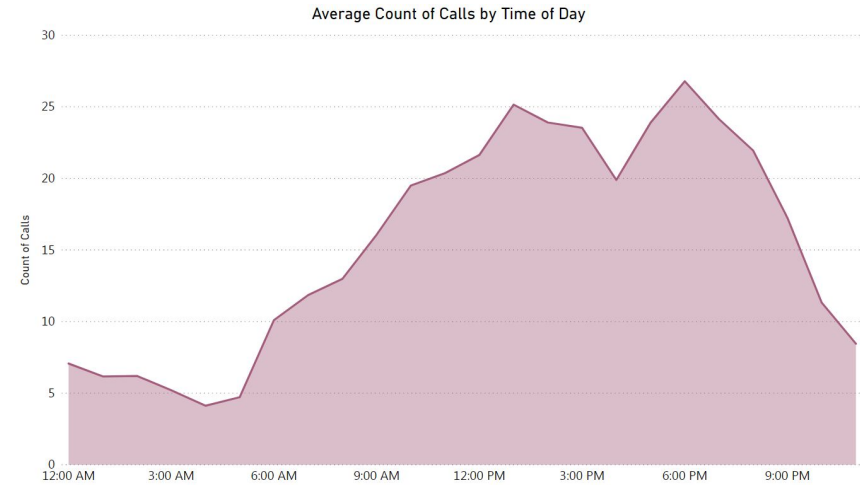
Average Count of Calls by Day of the Week

- Average weekday call volume: 64 calls per day
- Average weekend call volume: 54 calls per day
- Weekday call volume exceeds weekend call volume by 18.5 %



Calls by Time of Day

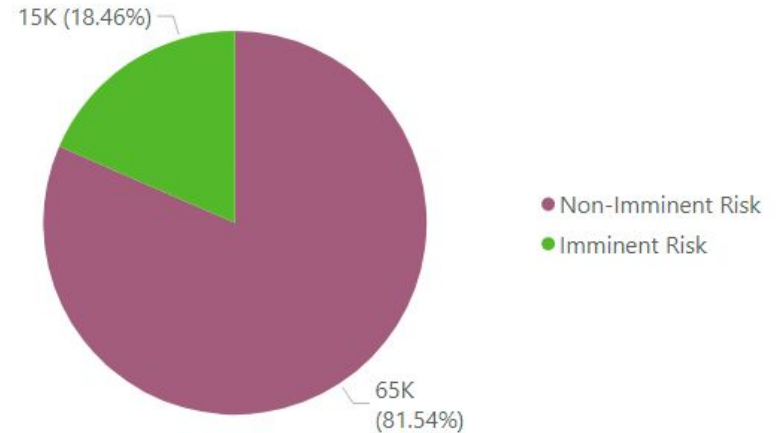
- Most calls fall between 6:00 AM and 9:00 PM, with peaks around 12:00 PM and 6:00 PM
- Calls average 10 minutes in length, regardless of time of day



Imminent Risk Call Volume

- Total Minutes spent with Non-Imminent Risk Calls - 65,276 minutes
- Total Minutes spent with Imminent Risk Calls - 14,781 minutes

Minutes Spent with Non-Imminent Risk and Imminent Risk



Analysis by Call Content

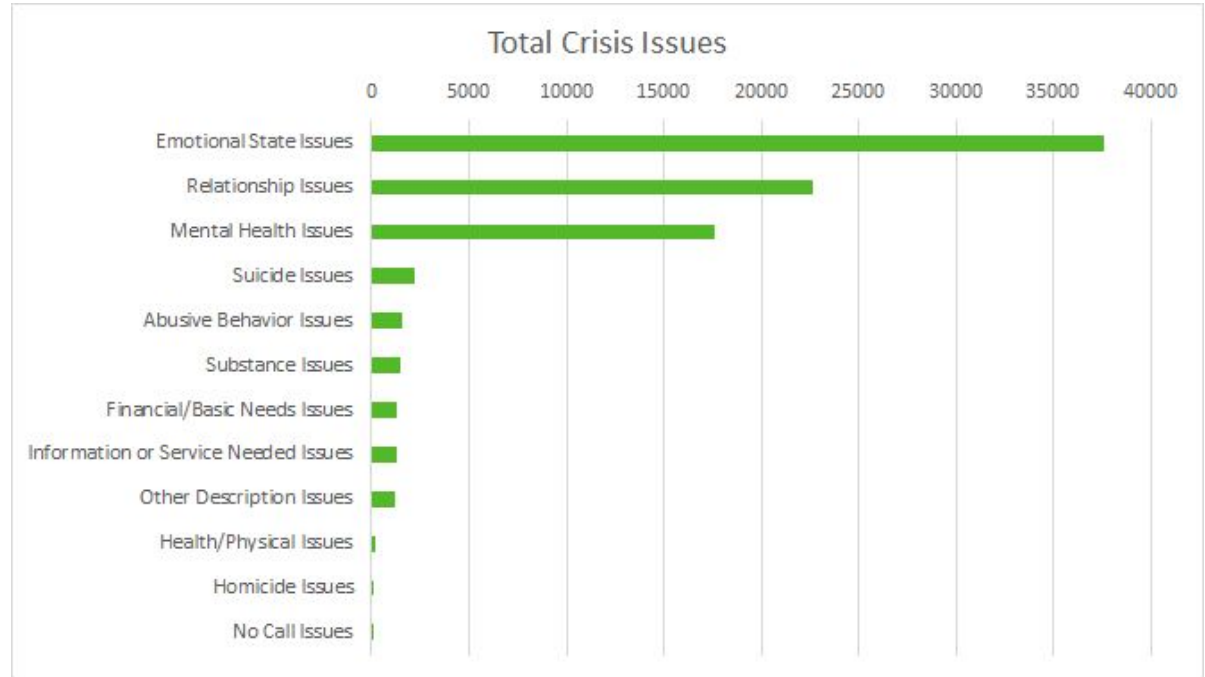
Key Considerations

- What issues are most common?
- What kinds of issues (crisis categories) are most prevalent?
- Are there differences in issues reported in 2019 vs. 2020?
- What issues are imminent risk callers reporting?

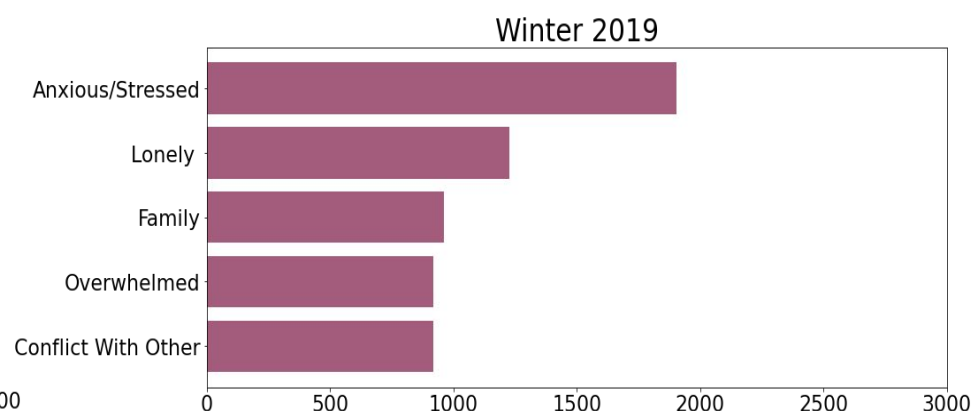
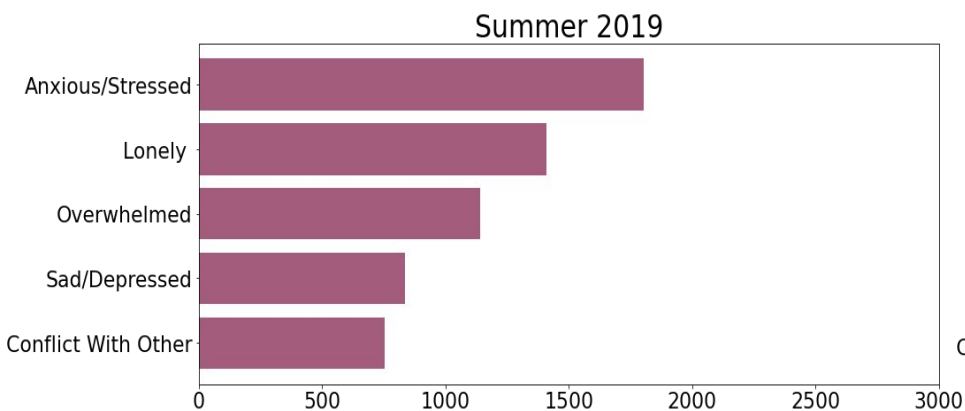
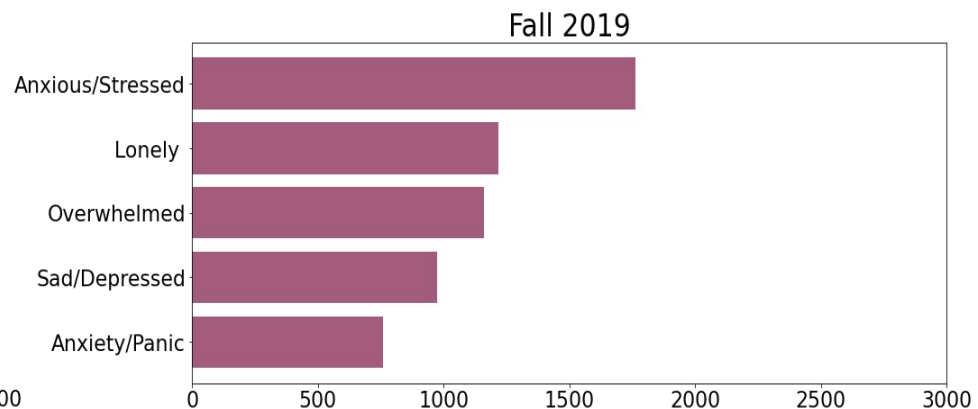
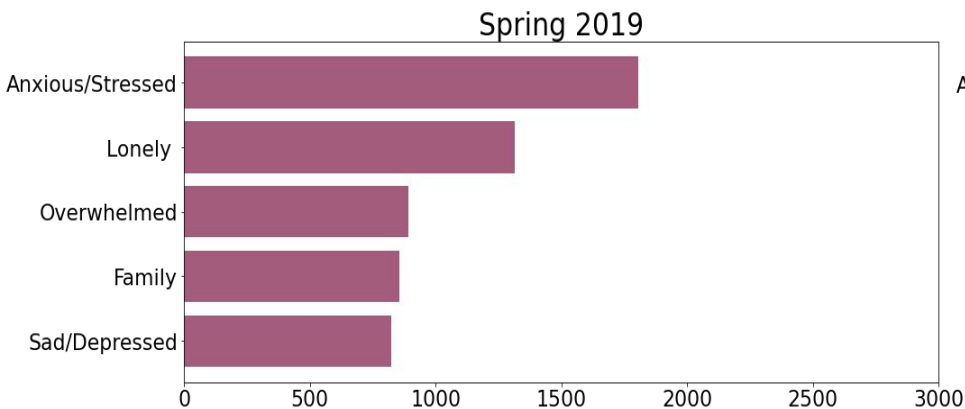


Issue Count by Crisis Category

- Top 3 Crisis Categories:
 - Emotional State:
37,613 issues
reported
 - Relationship Issues:
22,689 issues
reported
 - Mental Health
Issues: 17,652 issues
reported

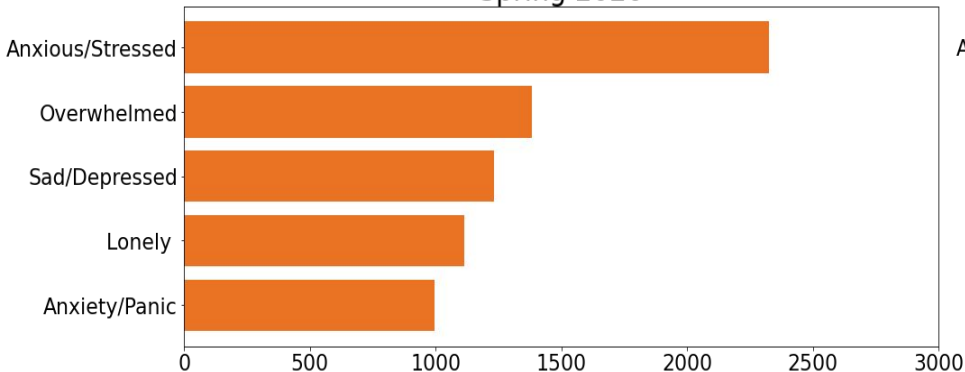


Most Prominent Issues 2019 v 2020

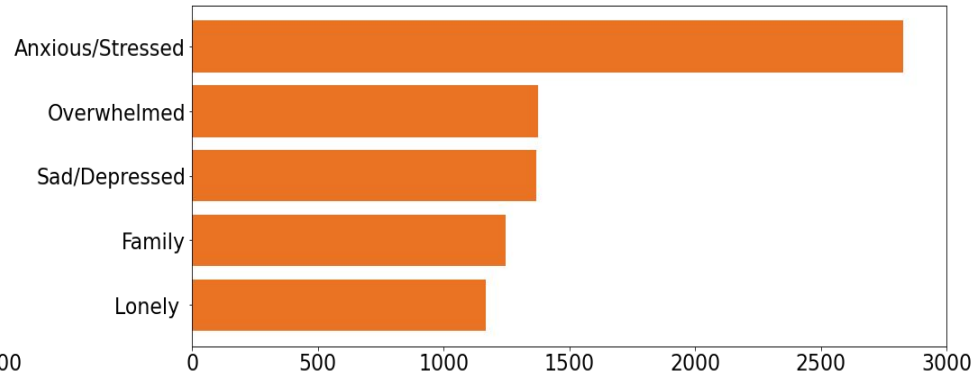


Most Prominent Issues 2019 v 2020

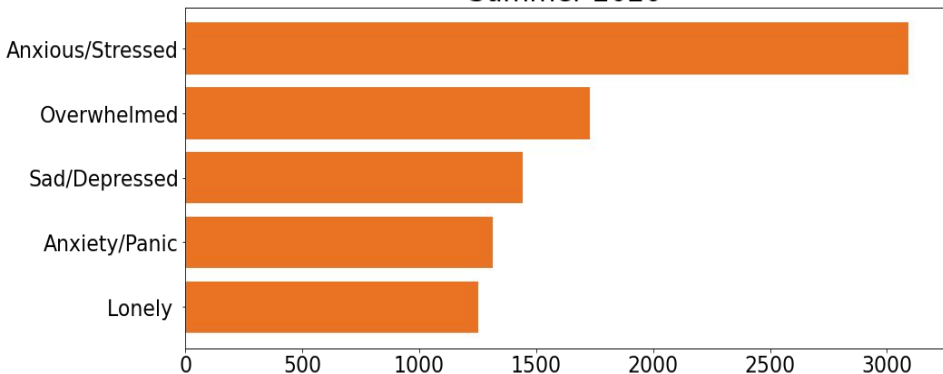
Spring 2020



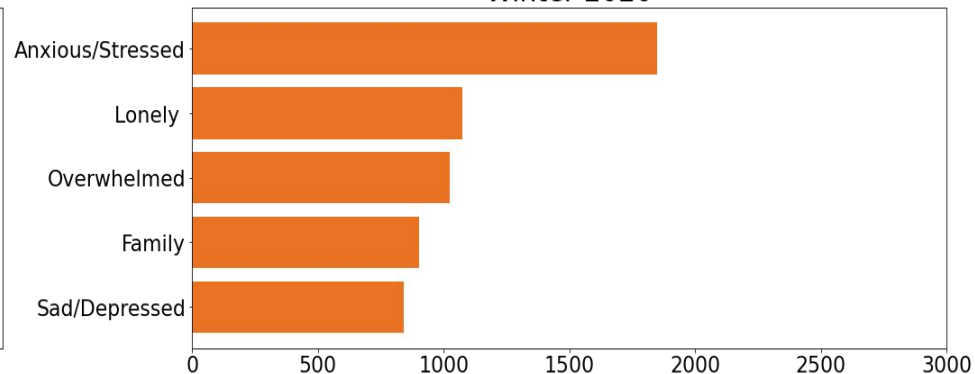
Fall 2020



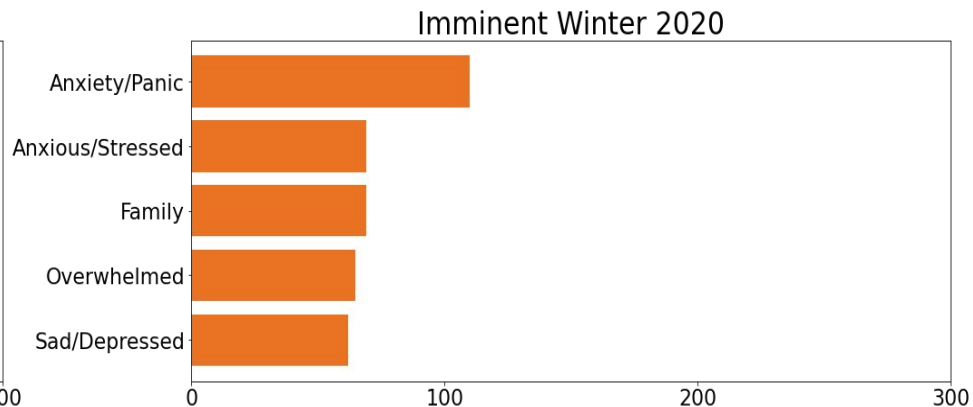
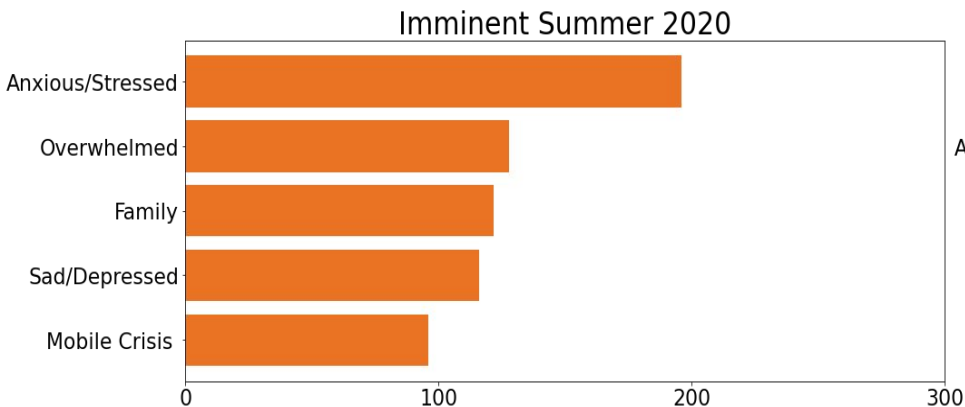
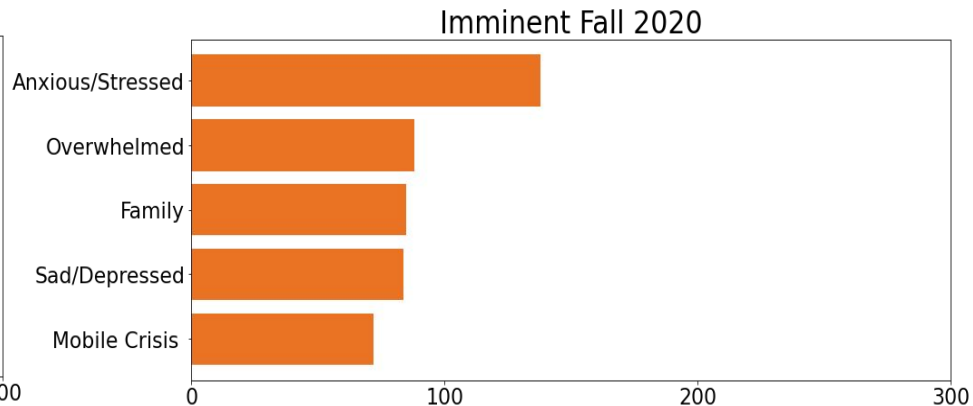
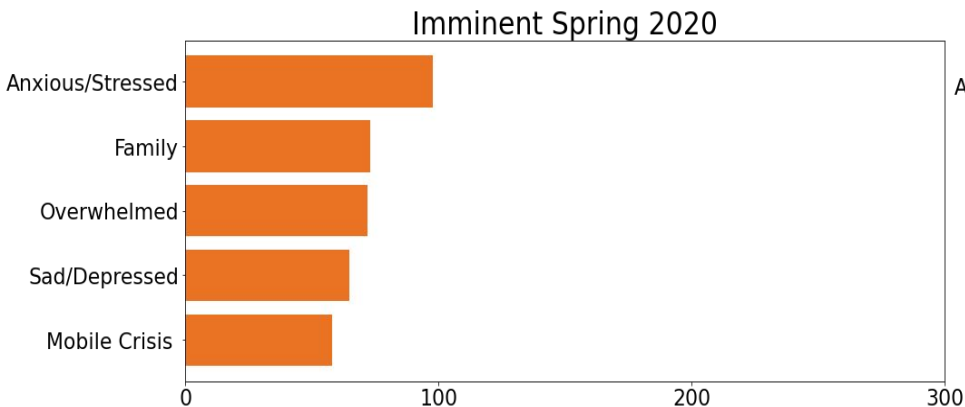
Summer 2020



Winter 2020



Most Prominent Issue Types for Imminent Risk Calls



Geographic Analysis

Key Considerations

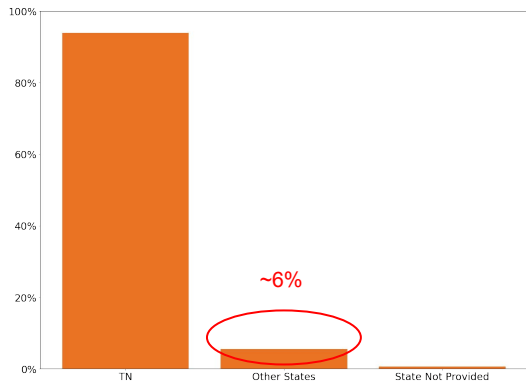
- How many callers are from out of state?
- What counties in Tennessee have the highest call volume?
- Which counties have the highest volume of imminent risk calls?



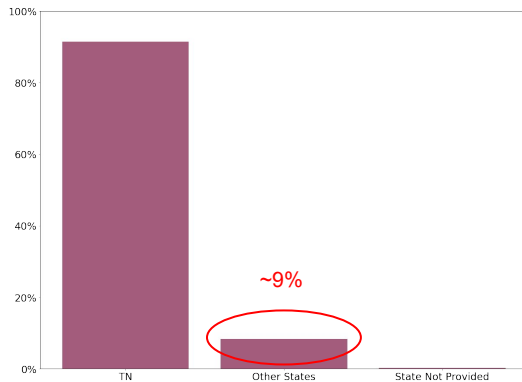
TN Calls vs Other State Calls

- For **2019**, roughly **6%** of **all calls** answered were from other states/unknown
- For **2020**, roughly **9%** of **all calls** answered were from other states/unknown
- In **2020**, roughly **6%** of all **imminent risk calls** answered were from other states/unknown

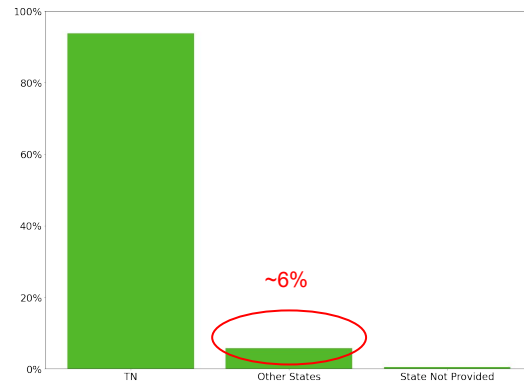
Percentage of TN Calls vs Other State Calls 2019



Percentage of TN Calls vs Other State Calls 2020

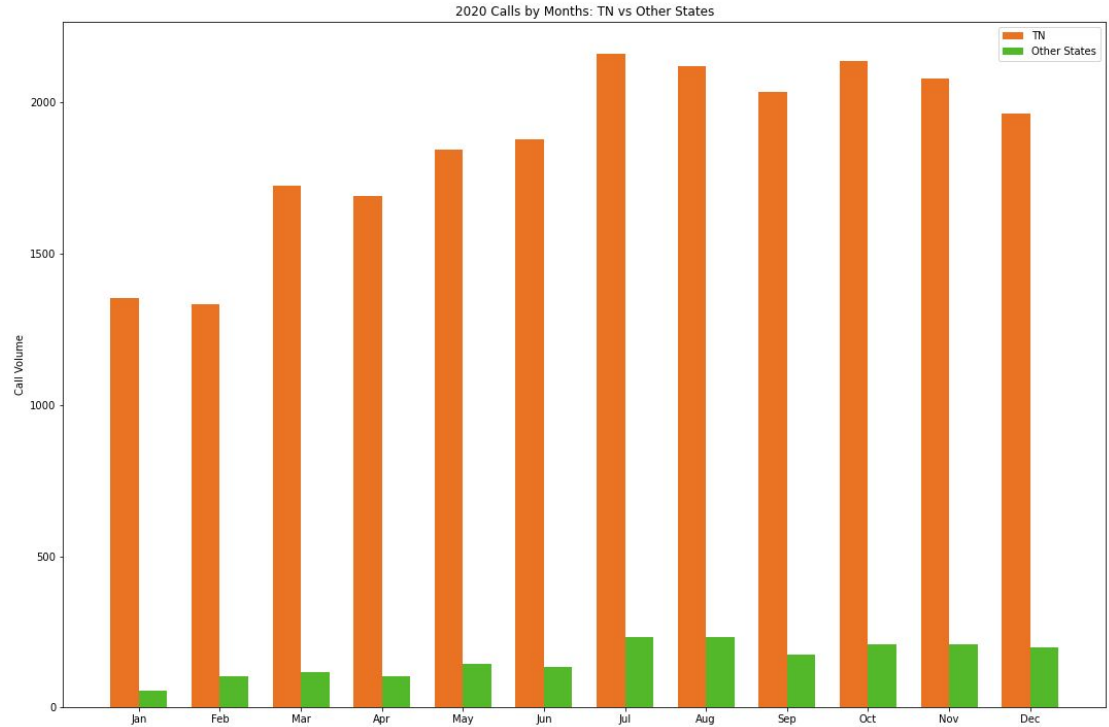


Percentage of TN Imminent Risk Calls vs Other State Imminent Risk Calls 2020



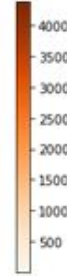
2020 Calls by Months: TN vs Other States

- Out of state call volume increased throughout the year, with July and August seeing the highest peaks of out of state calls (231 each in July and August, versus 144 in May and 135 in June)
- Top 3 out of state locations:
 - Wisconsin: 350 calls
 - Texas: 227 calls
 - Minnesota: 132 calls



Tennessee by County: All Calls

Total Calls by County in 2020



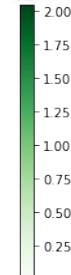
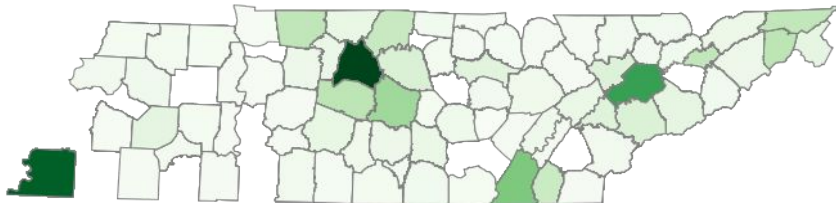
Davidson County has the most reporting of all calls by far.

Proportion of All Calls by County in 2020



When this is normalized by population, Haywood county stands out, as well as Chester, Robertson, Sumner, Davidson, Jackson, Polk, and Hawkins counties.

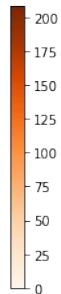
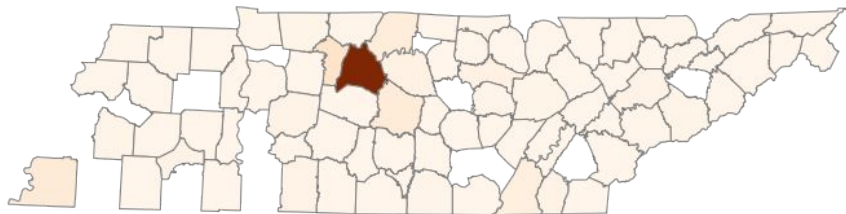
Population Density per Acre



Population density is included for reference and comparative purposes.

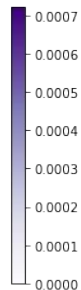
Tennessee by County: All Imminent Risk Calls

Total IR Calls by County in 2020



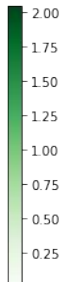
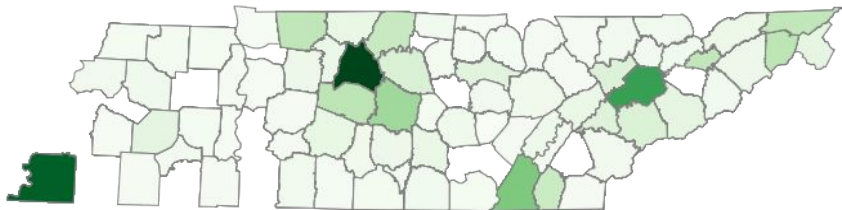
Davidson County has the most imminent risk calls by far.

Proportion of All IR Calls by County in 2020



When this is normalized by population, Cheatham county pops out. We also see Davidson, Haywood, Chester, and Hickman counties.

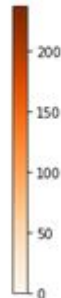
Population Density per Acre



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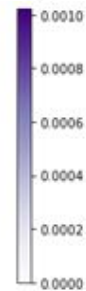
Tennessee by County: Imminent Risk Issues Reported

Total Imminent Issues Reported by County in 2020



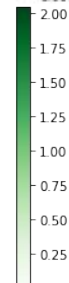
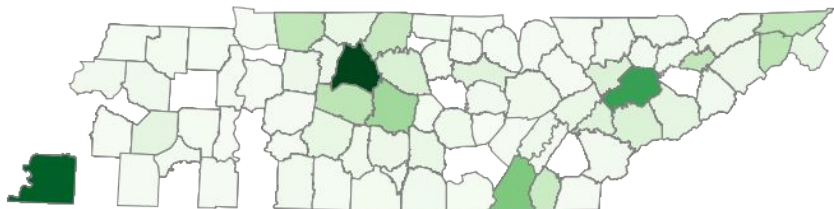
Davidson County has the most reporting of imminent issues by far.

Proportion of Imminent Risk Issues Reported by County in 2020



When this is normalized by population, Cheatham county stands out, as well as Haywood, Chester, Davidson, Jackson, and Hickman counties.

Population Density per Acre



Population density is included for reference and comparative purposes.

Demographic Analysis

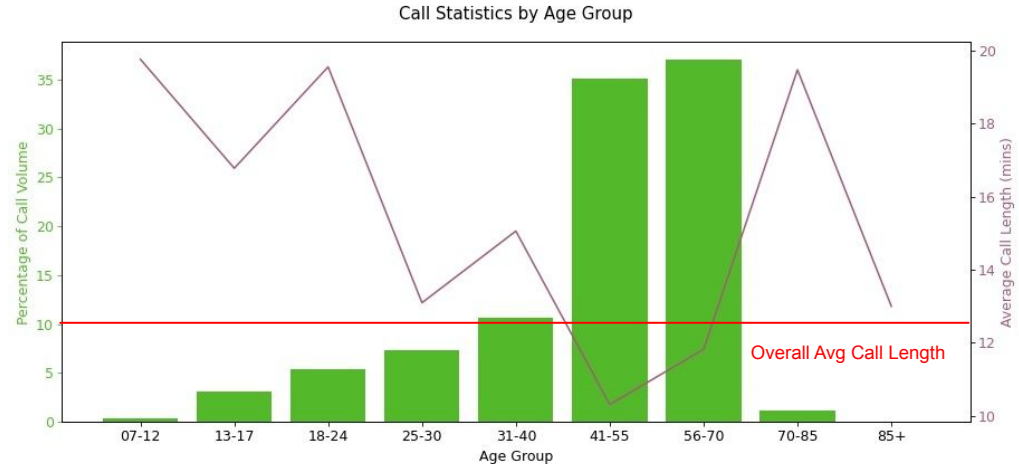
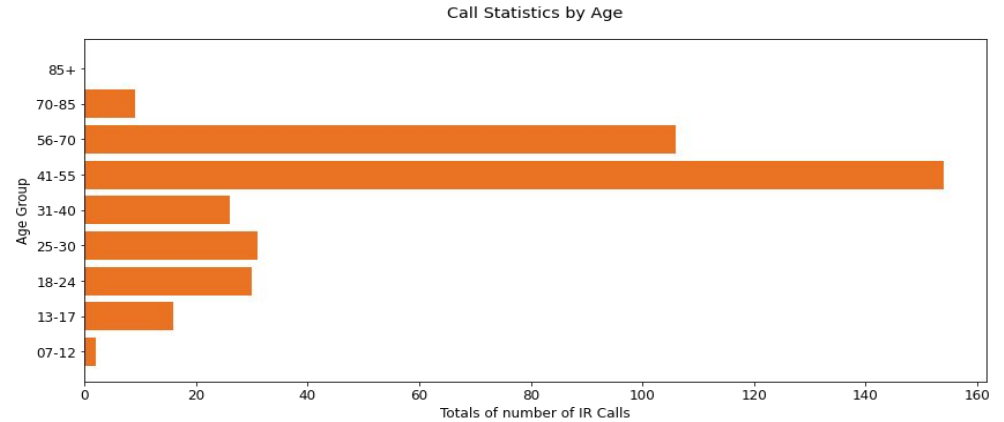
Key Considerations

- Who is calling?
 - Age
 - Ethnicity
 - Gender Identity
 - Marital Status
 - Employment Status
- How do crisis issues differ among these groups?
- How are imminent risk calls distributed among these groups?
- 34% of callers did not supply ANY demographic info; 53% of callers supplied 1 of 9 demographic data points; 62% of callers supplied 2 of 9 demographic data points

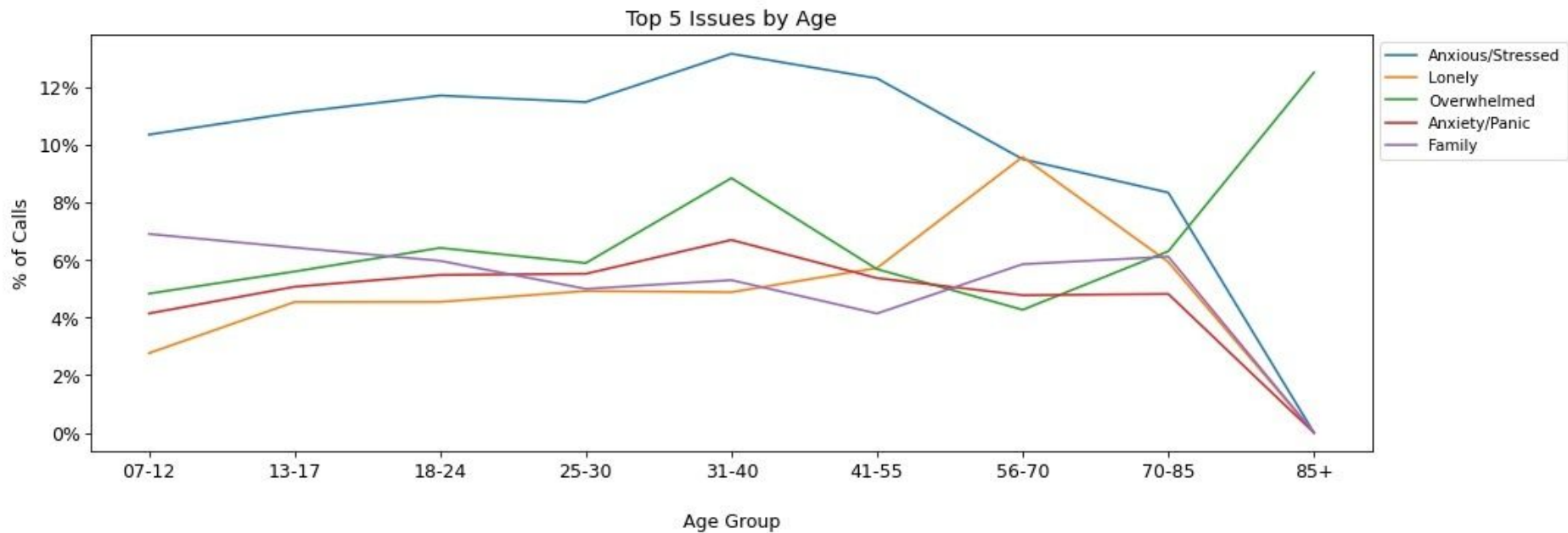


Demographics - Age

- There is a large spike in the 41 - 55 and 56 - 70 age groups, which account for over 70% of the identified callers.

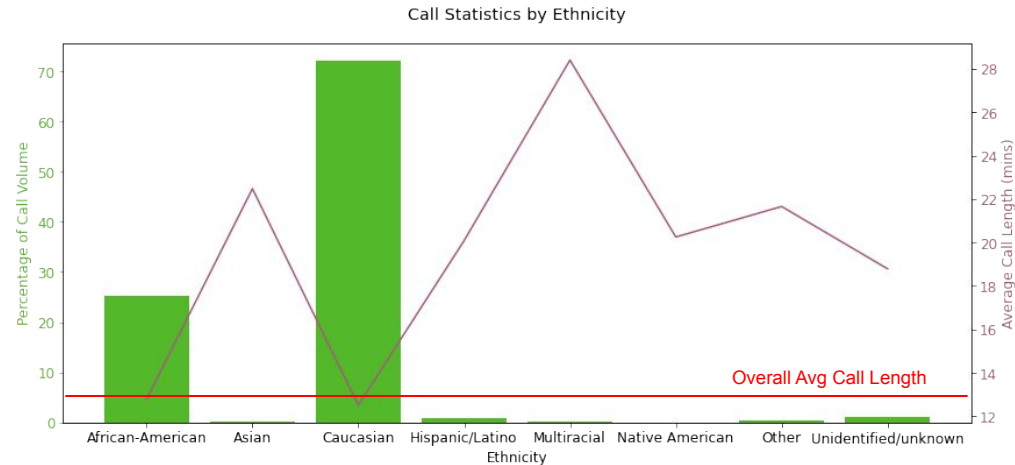
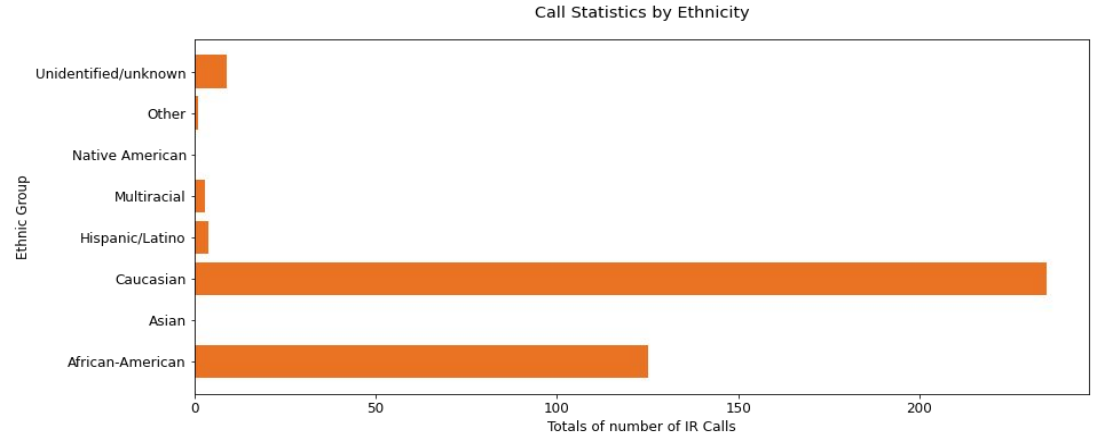


Demographics - Age

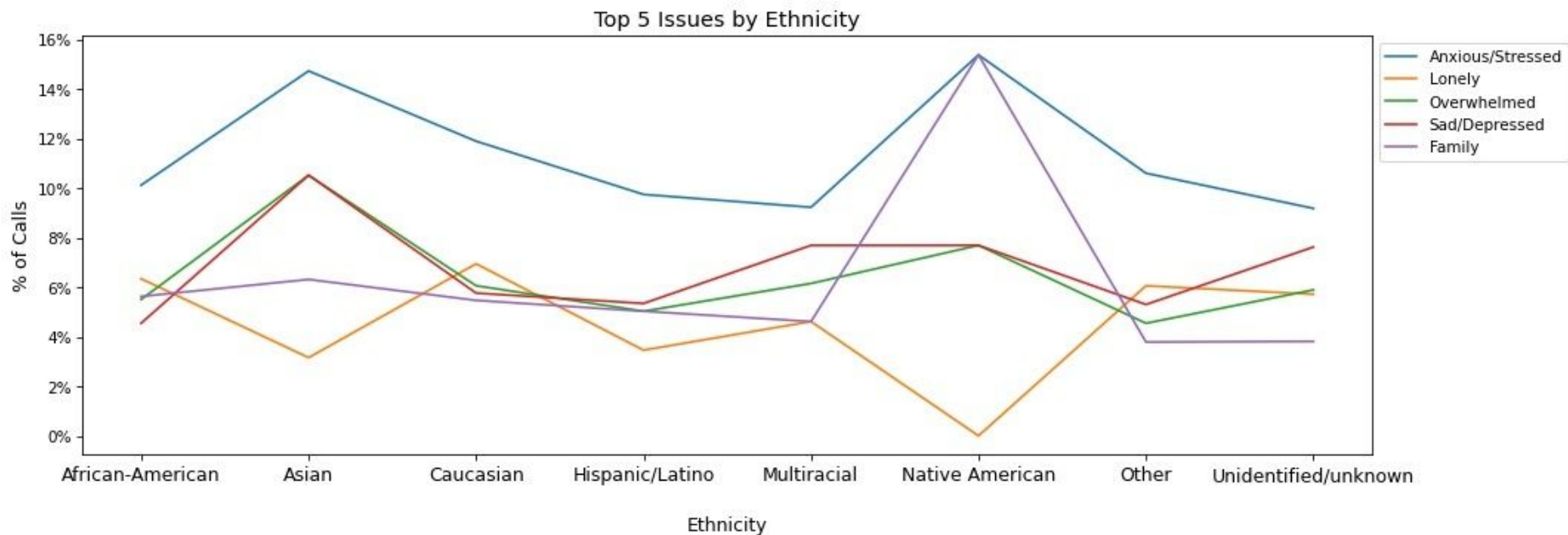


Demographics - Ethnicity

- Caucasian and African-American callers combined for almost all of the callers (> 95%).
- Other ethnic groups combined accounted for less than 5% of the identified callers.

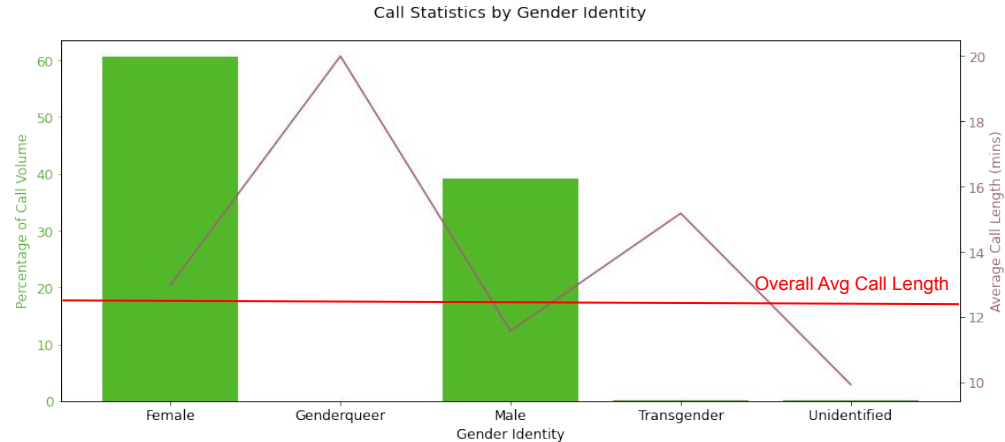
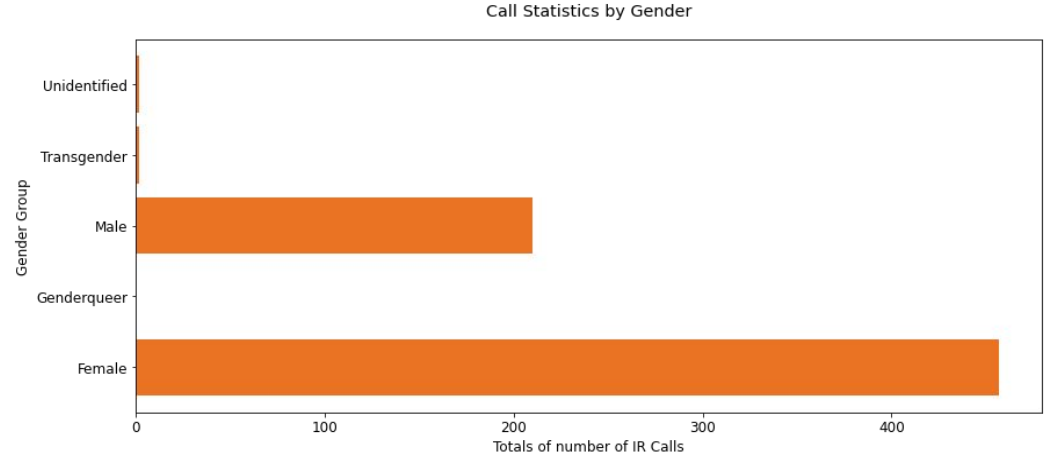


Demographics - Ethnicity

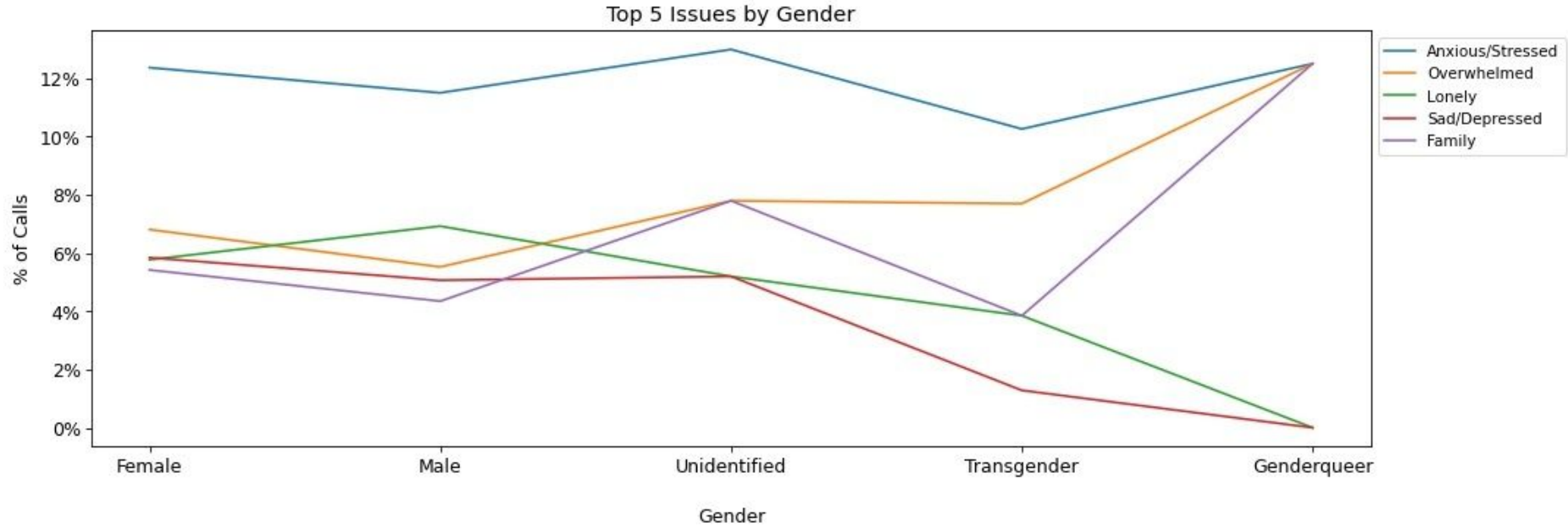


Demographics - Gender Identity

- Female callers were a larger share than male callers at a 3:2 ratio.
- Genderqueer, transgender, and unidentified callers made up less than 5% of callers.

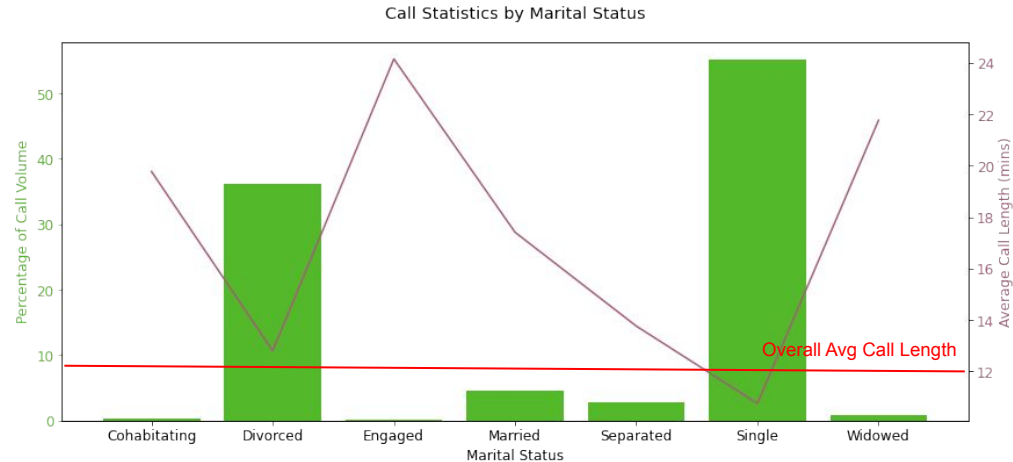
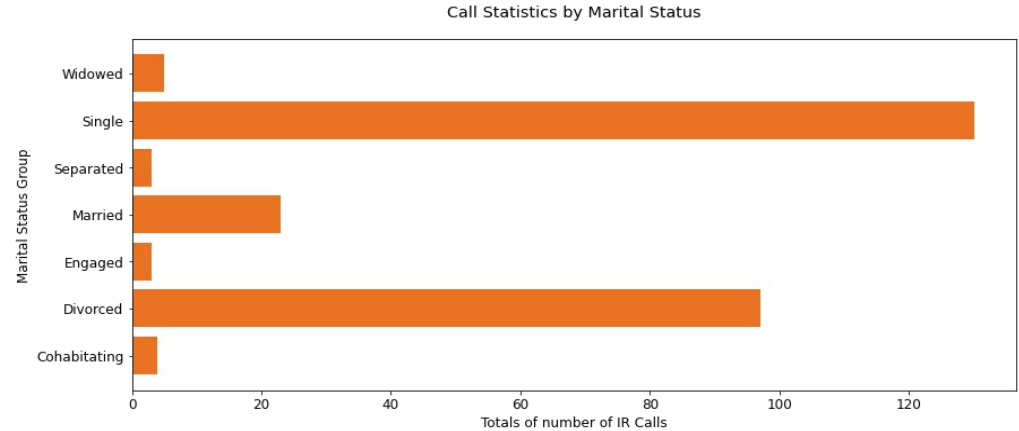


Demographics - Gender Identity

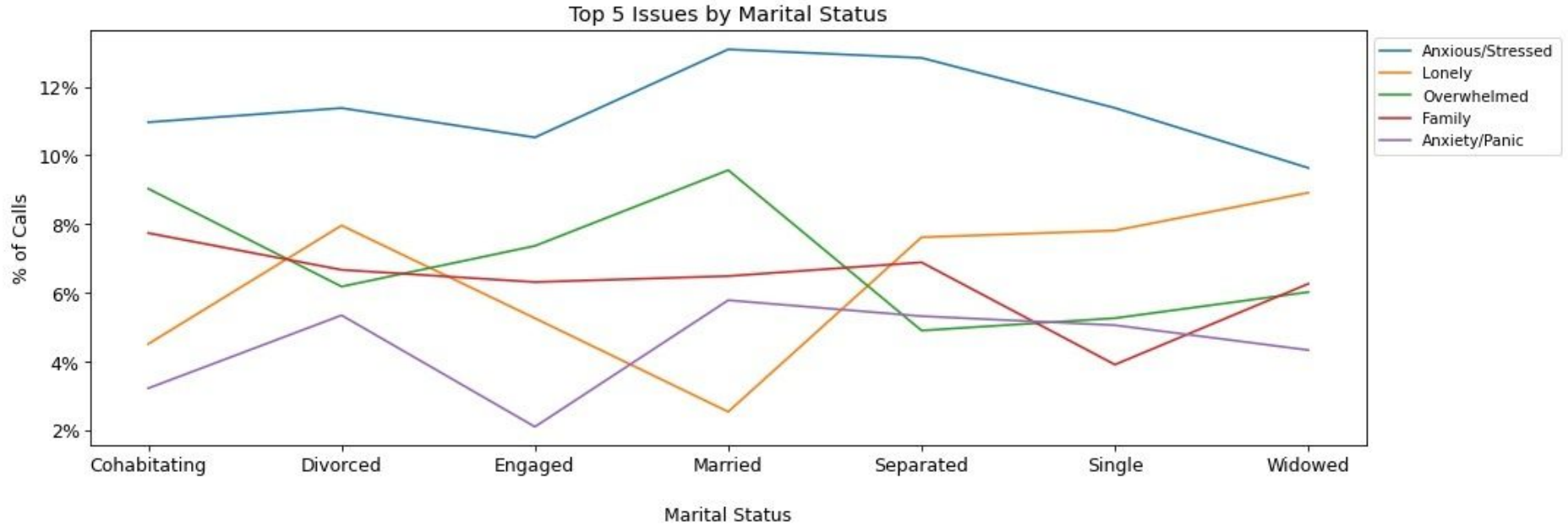


Demographics - Marital Status

- Single and divorced callers accounted for the significant majority of callers, combining for over 90%.

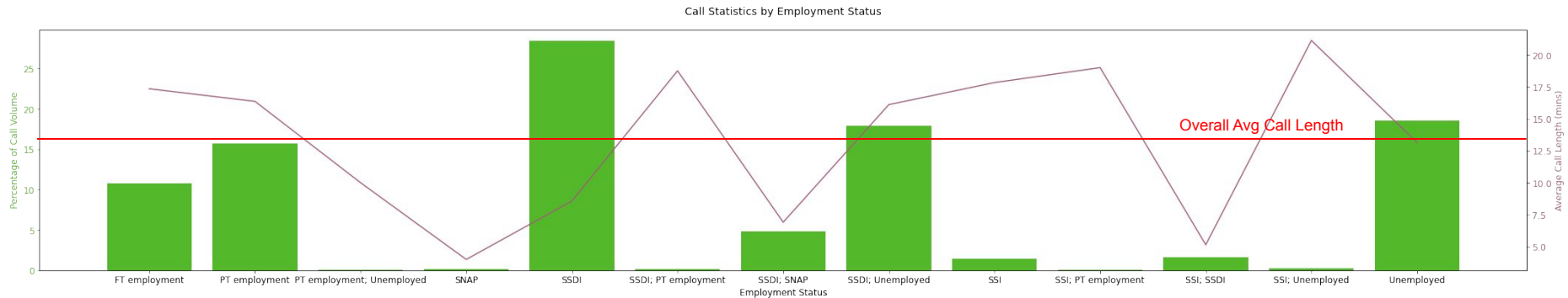
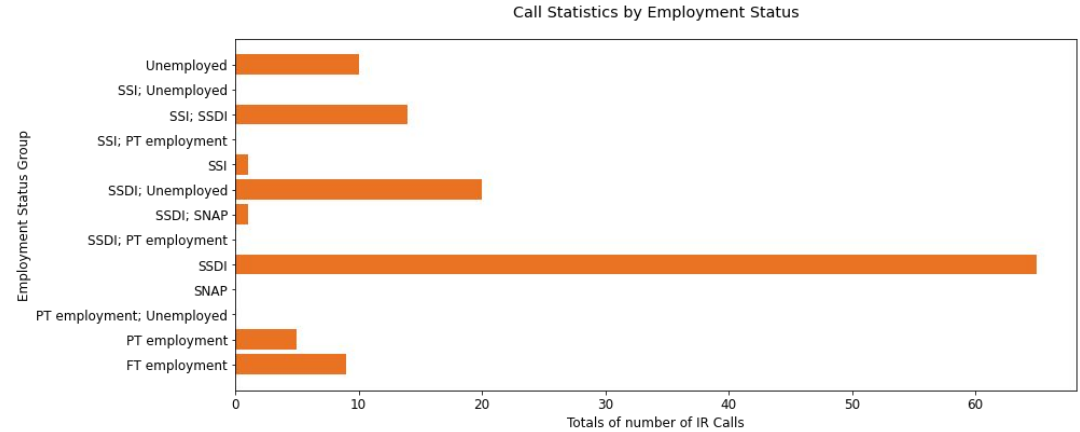


Demographics - Marital Status

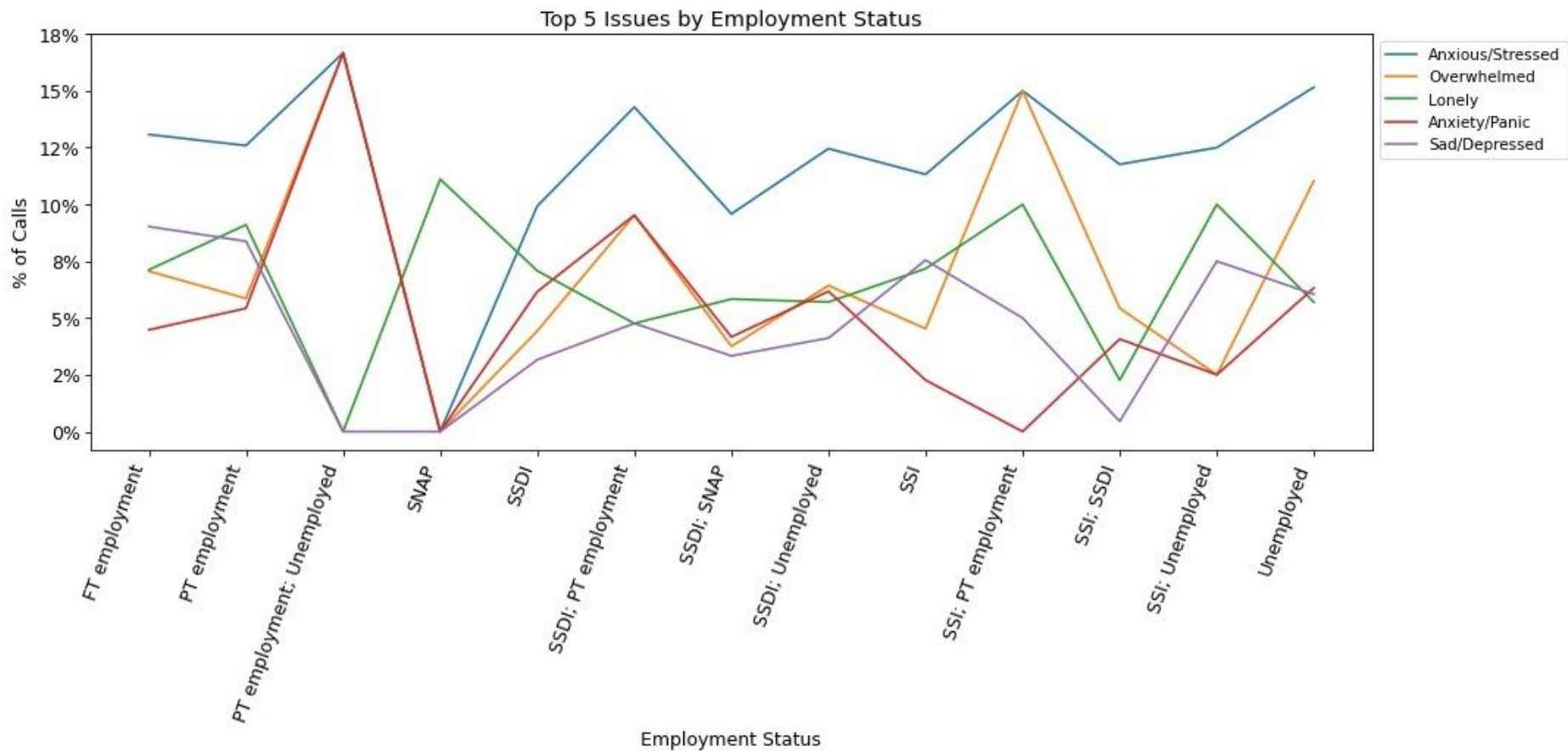


Demographics - Employment Status

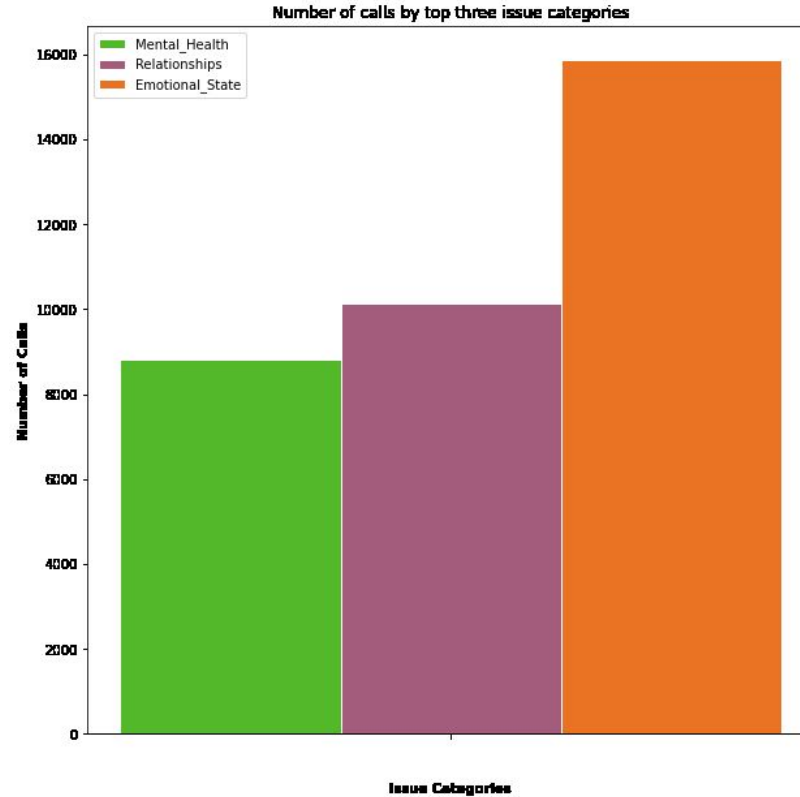
- Roughly 55% of callers rely on some form of Social Security Disability Insurance (SSDI).



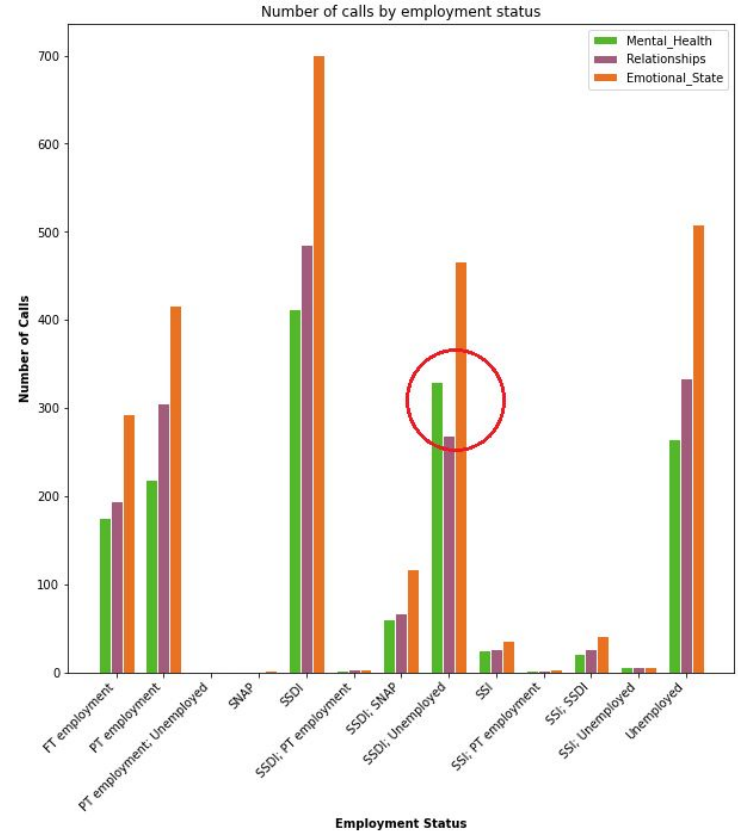
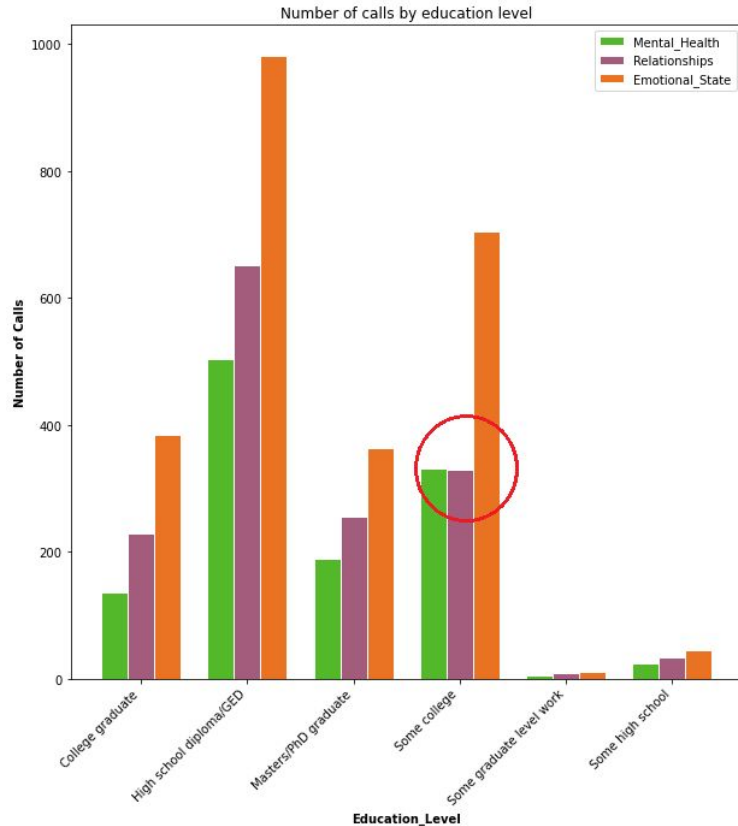
Demographics - Employment Status



Demographics - Issue Categories



Demographics - Issue Categories



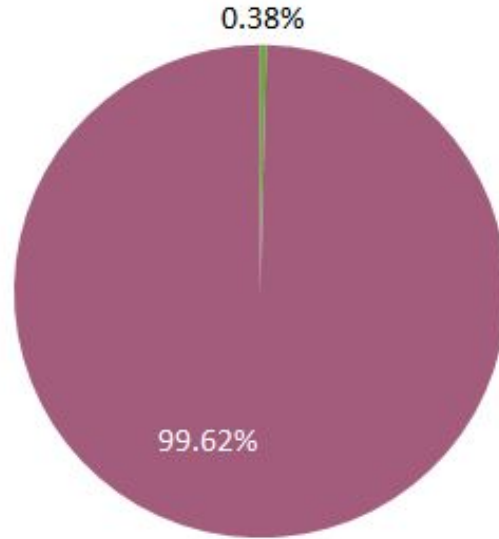
Analysis of Repeat & One Time Callers

Key Focus Areas for Analysis

- Define the two types of callers, **repeat callers** and **one time callers**:
 - **Repeat callers** are individuals who call the center multiple times and have a **unique Call Number** assigned to them. **One time callers** are individuals who have not called the line before and have a **-1** assigned to their Call Number.
- Key focus areas:
 - Identify trends or patterns between **types of crisis issues** for both repeat and one time callers.
 - Explore **time of calls made by repeat callers** to determine if there are clear high or low volume time periods.
 - Determine **how many calls are deemed as “imminent risk”** and what the breakout is among repeat and one time callers.
 - Calculate **how many minutes are spent on calls classified as “imminent risk”** by repeat and one time callers.

Breakdown of Total Calls by Caller Type

Percent of Total Callers by Caller Type



■ Repeat Callers ■ One Time Callers

58

Repeat Callers

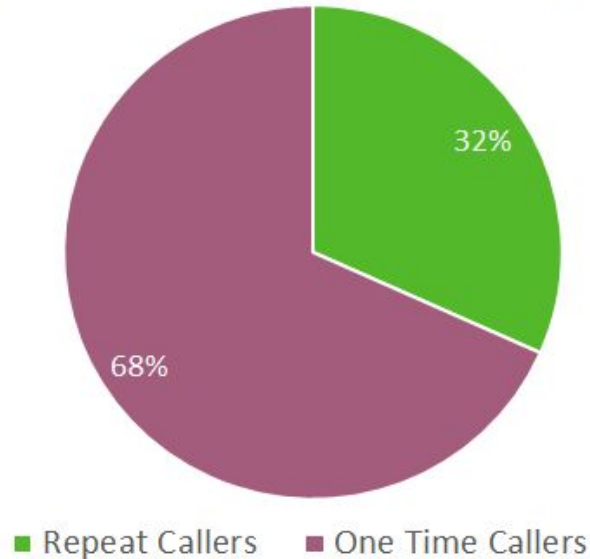
15,254

One Time Callers

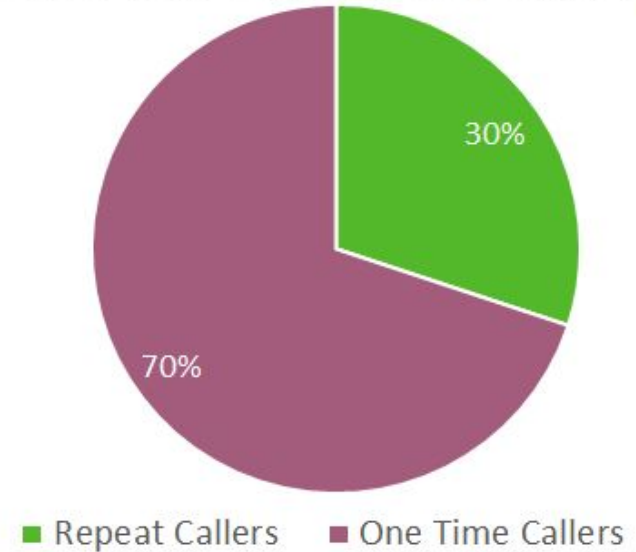
Breakdown of Total Calls by Caller Type

- Repeat callers, or 58 individuals, accounted for 32% of total calls.
- Repeat callers accounted for 30% of total call minutes in 2020.

Percent of Total Calls by Caller Type



Percent of Total Call Minutes by Caller Type



Imminent Risk Calls by Caller Type

- Almost 15K total minutes were spent on calls that were categorized as “imminent risk.” Repeat callers accounted for 22% of these calls.

Percent of Imminent Risk Calls by Caller Type



202

Imminent Risk Calls
by Repeat Callers

2,486

Minutes Spent with
Imminent Risk Repeat
Callers

732

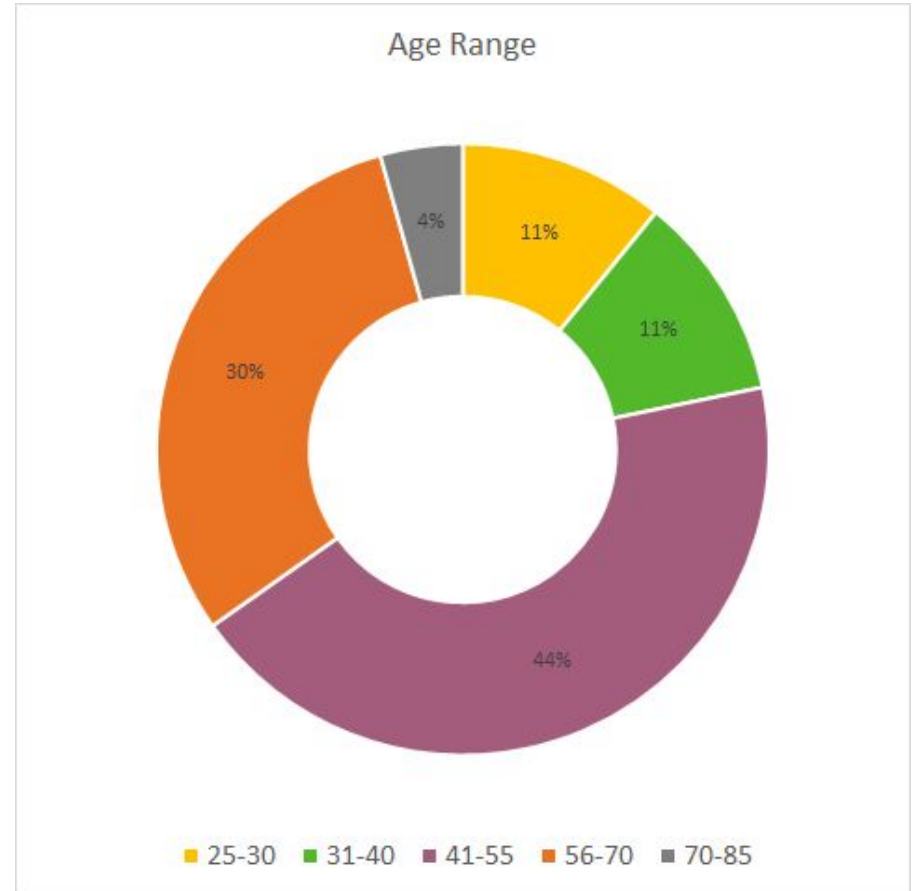
Imminent Risk Calls
by One Time
Callers

12,295

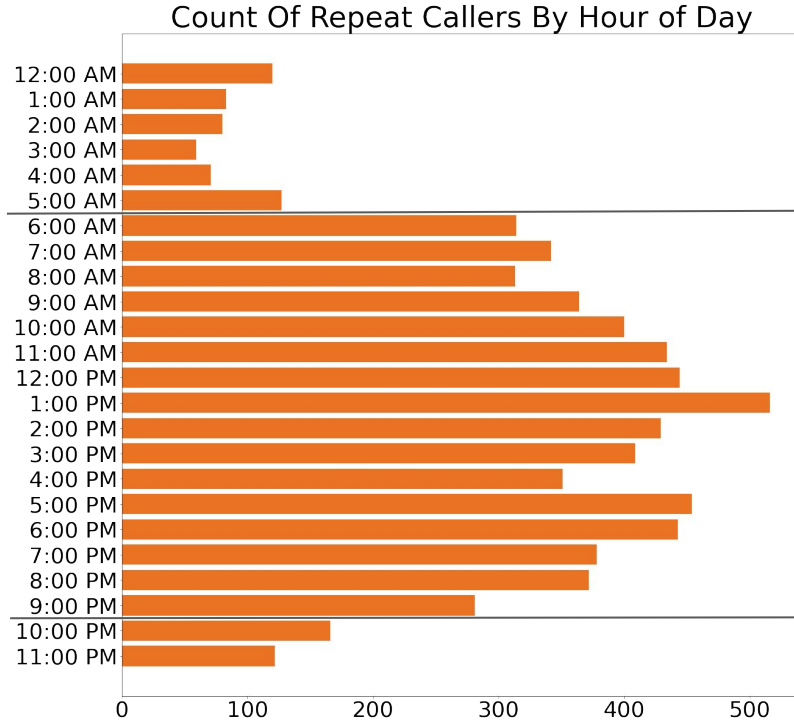
Minutes Spent with
Imminent Risk One Time
Callers

Demographics of Repeat Callers

- Gender:
 - 33 female
 - 21 male
 - 4 unknown
- Race:
 - 35 caucasian
 - 11 black
 - 12 unknown
- Disability status:
 - 25 disabled
 - 33 not disabled or status unknown
- Marital Status:
 - 26 single
 - 3 married or cohabitating
 - 12 divorced or separated
 - 15 unknown



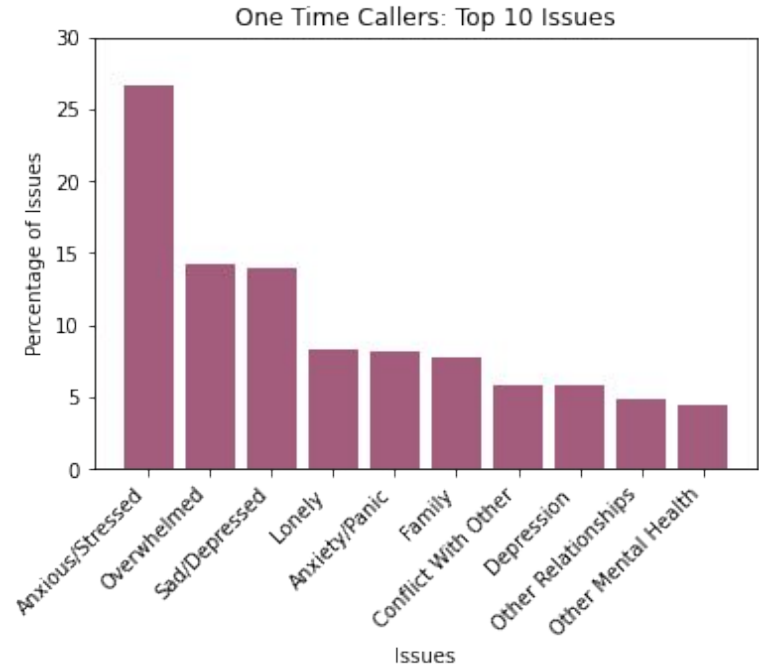
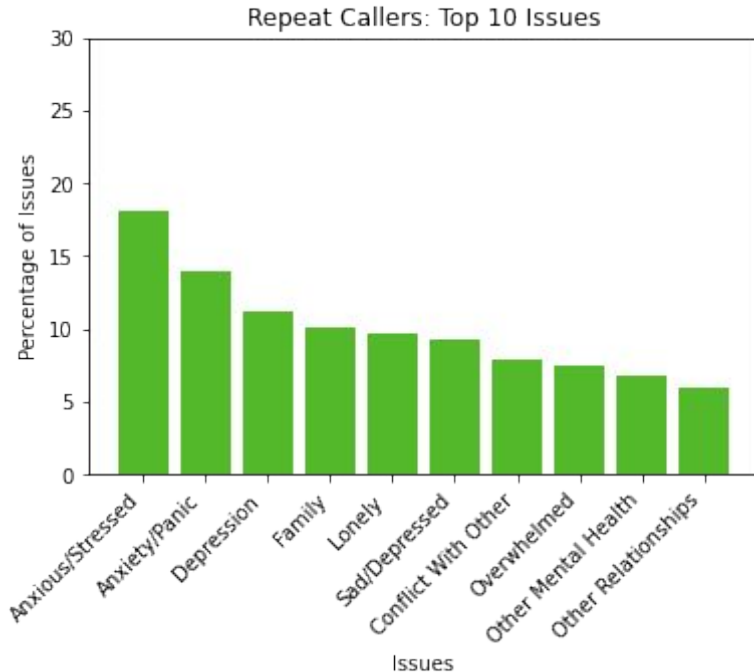
Repeat Callers by Hour of Day



- The bulk of repeat callers call between 6:00am and 9:00pm
- Most callers seemed to have “normal” sleep schedules
- Our findings suggest an opportunity to increase staffing during the daytime hours, rather than the off-hours of the night.

Top 10 Crisis Issues by Caller Type

- The top five crisis issues for the repeat callers and one time callers overlap for the following: Anxious/Stressed, Anxiety/Panic, Depression and Lonely

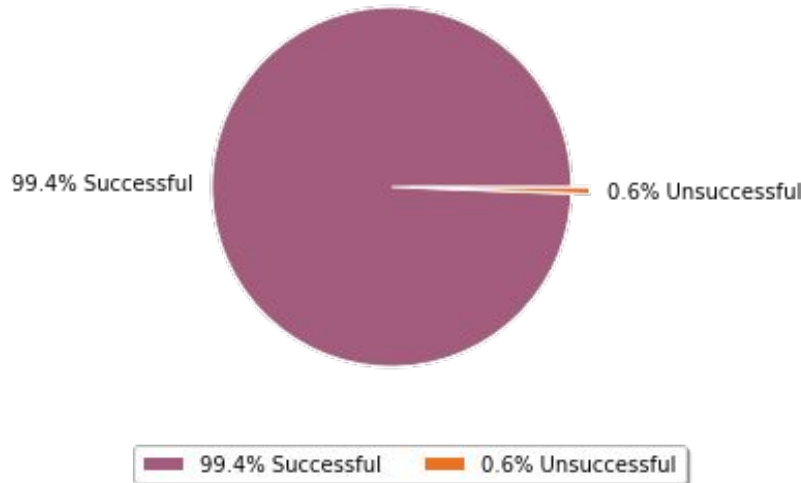


Imminent Risk & Value/Needs Analysis

High Imminent Risk Success Rate

Of **934** imminent risk calls identified in 2020, **928** were identified as successful. FCS has a **99.4% success rate** for imminent risk calls!

Success Rate for Imminent Risk Calls



934

Total Imminent Risk calls

928

Successful Imminent Risk calls

6

Unsuccessful Imminent Risk calls

If an imminent risk call is unsuccessful:

- Person will likely go to the ER. The average cost for an **emergency room visit** in the US is ~\$1,400.
- If person is deemed a threat to themselves, they are placed in inpatient psychiatric care for **72 hours**. Estimated cost is **\$800/day** or **\$2,400 total**. There are state psychiatric hospitals providing free care, however, space is usually limited.
- If admittee can't pay for care, **cost is absorbed** by healthcare company or city. ***These are real expenses.***

Average cost of ER visit:

\$1,400

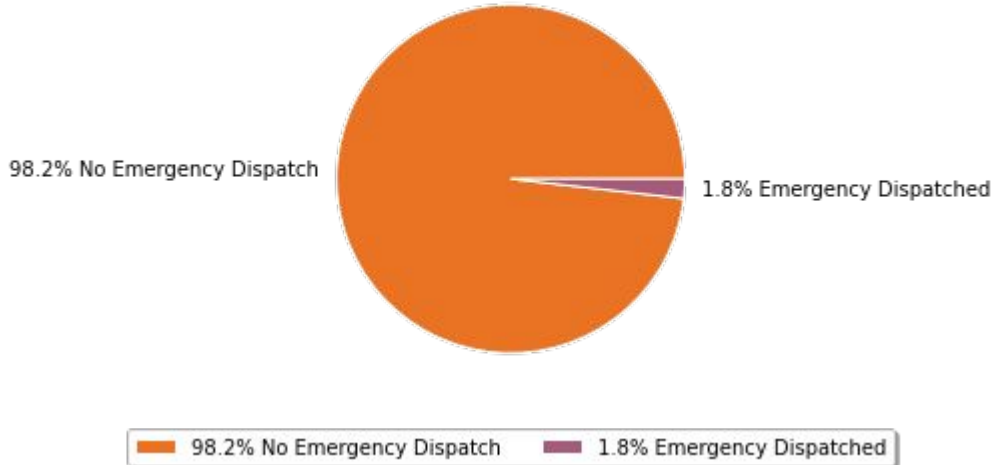
Estimated cost of 3-day
inpatient psychiatric care:

\$2,400

Low Emergency Dispatch Rate

Of **934** imminent risk calls identified in 2020, emergency rescue was dispatched only **17** times. FCS has an **emergency rescue dispatch rate of 1.8%** for imminent risk calls!

Rate of Emergency Rescue Dispatch



917

Imminent Risk calls with no
emergency rescue dispatch

17

Imminent Risk calls with
emergency rescue
dispatched

Value and Unmet Need

- 917 imminent risk calls with no emergency rescue dispatch * \$3,800 = **\$3,484,600 in healthcare savings** created by FCS, making this program incredibly valuable!
- In 2020, **16,620 calls** or 36% of calls received, were **not answered**. Some of these may have rolled to backup locations.
- Based on imminent risk call %, we can estimate that **339 imminent risk calls** were among those received but **not answered** by FCS in 2020.

~\$3.5 million

in potential healthcare savings created
by FCS

16,620

Calls Unanswered

339

Estimated Imminent Risk
Calls Unanswered

Key Insights

Key Insights

- Call volume:
 - Higher on weekdays than weekends
 - Most calls come between 6:00am and 9:00pm and average about 10 minutes
 - Political and weather events created swells in call volume rather than spikes
- Call content:
 - Most common crisis categories are emotional states, mental health & relationships
 - The major issues of 2020 (especially COVID) remain ongoing ones. We can reasonably predict call volumes will stay high or possibly increase throughout 2021
- Call location:
 - When normalized by population, we see an increase in calls, imminent risk calls, and imminent risk reports from Sumner, Jackson, Polk, Hickman, Cheatham, Hawkins, Haywood, and Chester counties. Davidson county maintains a relatively high concentration in all of these categories when normalized by population.

Key Insights (continued)

- Caller demographics:
 - Callers were primarily middle-aged (41 - 70); Caucasian or African-American; traditional gender-labeled (Female, Male); Single or Divorced
- Repeat callers:
 - Make up less than 1% of callers but constitute approximately $\frac{1}{3}$ of call volume (both number of calls and duration of calls)
 - Represent 22% of imminent risk calls, showing that they are among the highest risk callers
- The high rate of unanswered calls allows FCS to make a strong case for increased staffing
- FCS can make a strong case (including to Healthcare companies) for increased funding by showing it saves nearly \$3.5 million/year in avoided ER visits & inpatient psychiatric stays.

Questions?