# SDOH Analysis (Last Update 11/15)

## Brief Background

SDOH,social determinants of health, are numerous factors that affect the quality of life as well as a wide range of health outcomes for the people who live and work in the places where they live and work.Incorporating SDOH data into research that supports the quality and delivery of health care is important for better understanding the relationships between community-level factors, individual health, and health care quality and delivery. As a result of research, it has been proven that physical environment, housing instability, unemployment, race, and poverty, among others, are all associated with poor health conditions. In New York City, for instance, these factors contribute to neighborhood-level differences in life expectancy by as much as ten years as a result of these factors.

This is analysis report, I will mainly forcus on factors related to SDOH, for example education level, access to wrok and other factors might affect or related to it to discover how the situation is. And do some deeper analysis by modeling and exam effects of certain feather. For example, whether people have high education background cares more about health issue; If family a big factor affect the health issue, etc.

## Data Set & Analysis Report Structure

The analysis is based on several data sets: PRAPARE Report, Ooutcomes Summary, and other helpful datas like demographics(From Core) functional as additional information.

The other dataset for SDOH analysis is from AHRQ(Agency for Healthcare Research and Quality) https://www.ahrq.gov/sdoh/data-analytics/sdoh-data.html#download (https://www.ahrq.gov/sdoh/data-analytics/sdoh-data.html#download)

The dataset contains 85529 data points covered from 2009 to 2020.

PRAPARE Report: (From Izenda)This is a survey based or inclined data set, containing 721 rows and 25 columns. Every row represent one response of the survey and every column is one of the question of the survey. There is only 653 unique clients. The way to drop duplicate is to keep the most recent one and drop the older one.

Outcomes Summary(From Izenda): This dataset contains more than 13,300 rows and 21 columns. It stores different responses by different client to the survey reflecting the background and personal condition of each client. Note the data sets contain duplicates. They way to drop duplicate is to keep the most recent one and drop the older one.

The analysis will start at data processing and preparing to EDA known as exploratory data analysis. And then follow by the deeper analysis with models.

## Setup

In [1]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from matplotlib import rcParams
from matplotlib import pyplot
```

## Part 1 Data Processing and Preparing

In [2]:

```
# Load all data sets
pra = pd.read_csv('PRAPARE Report.csv')
demo = pd.read_excel('Demographics.xlsx')
out = pd.read_excel('Outcomes Summary.xlsx')
```

In [3]:

```
# Drop Duplicates and keep all unique clients
# Keep the most recent data
dup1 = pra['Client ID'].duplicated(keep = 'last')
pra['Client ID'].iloc[dup1[dup1].index]
pra.drop(dup1[dup1].index, axis=0, inplace=True)
```

In [4]:

```
pra.head()
```

Out[4]:

| | Client ID | Last Name | First Name | Location Name | Are you Hispanic or Latino? | Which race are you? | Migrant Work? | Armed Forces? | Lang |
|---|---|---|---|---|---|---|---|---|---|
| **0** | 2 | WATSON | SANDRA | Milestone SH (100 Beds) | No | Black/African American | No | No | Er |
| **1** | 3317 | Patton | Mary | Queens SH I - 653 | No | Black/African American | No | No | Er |
| **2** | 4360 | RODRIGUEZ | EMMANUEL | Queens SH III POP A - 654 | Yes | I choose not to answer this question | No | No | Er |
| **3** | 4361 | Litvyakov | Sergey | Lewis Ave Supported Housing | No | White | No | No | Er |
| **4** | 4363 | MABERY | SHANINE | ADULT HOME HOME SHP (62 BED) | No | Black/African American | No | No | Er |

5 rows × 25 columns

In [5]:
```
# Keep all needed variables
demo = demo[['CLIENTID','DATEOFBIRTH','GENDER','AGE']]

# Drop Duplicates and keep all unique clients
# Keep the most recent data
demo = demo.drop_duplicates()
demo.head()
```

Out[5]:

| | CLIENTID | DATEOFBIRTH | GENDER | AGE |
|---|---|---|---|---|
| **0** | 2.0 | 1958-09-23 | Female | 64.0 |
| **2** | 3.0 | 1958-01-23 | Female | 64.0 |
| **4** | 4.0 | 1989-11-02 | Male | 33.0 |
| **5** | 5.0 | 1968-06-19 | Female | 54.0 |
| **7** | 6.0 | 1967-06-15 | Female | 55.0 |

In [6]:

```
# Creating new feature naming Generation indicating which generation t
# Generating generation intervels
The_Greatest_Generation_S = pd.Timestamp('1901-01-01')
The_Greatest_Generation_E = pd.Timestamp('1924-12-31')
The_Slient_Generation_S = pd.Timestamp('1928-01-01')
The_Slient_Generation_E = pd.Timestamp('1945-12-31')
Baby_Boom_Generation_S = pd.Timestamp('1946-01-01')
Baby_Boom_Generation_E = pd.Timestamp('1964-12-31')
Generation_X_S = pd.Timestamp('1965-01-01')
Generation_X_E = pd.Timestamp('1980-12-31')
Generation_Y_S = pd.Timestamp('1981-01-01')
Generation_Y_E = pd.Timestamp('1996-12-31')
Generation_Z_S = pd.Timestamp('1997-01-01')
Generation_Z_E = pd.Timestamp('2010-12-31')

# Function assign each client a generation based on the birthday
def generation(x):
    result = []
    for i in x:
        if i > The_Greatest_Generation_S and i <= The_Greatest_Generat
            result.append('The_Greatest_Generation')
        elif i > The_Slient_Generation_S and i <= The_Slient_Generatic
            result.append('The_Slient_Generation')
        elif i > Baby_Boom_Generation_S and i <= Baby_Boom_Generation_
            result.append('Baby_Boom_Generation')
        elif i > Generation_X_S and i <= Generation_X_E:
            result.append('Generation_X')
        elif i > Generation_Y_S and i <= Generation_Y_E:
            result.append('Generation_Y')
        elif i > Generation_Z_S and i <= Generation_Z_E:
            result.append('Generation_Z')
        else:
            result.append('Generation Alpha')
    return result
```

In [7]:

```
# Creating new feature naming generation
demo['Generation'] = generation(demo['DATEOFBIRTH'])

# Rename the col so as to merge later
demo = demo.rename(columns={'CLIENTID':'Client ID'})
demo.head()
```

Out[7]:

| | Client ID | DATEOFBIRTH | GENDER | AGE | Generation |
|---|---|---|---|---|---|
| **0** | 2.0 | 1958-09-23 | Female | 64.0 | Baby_Boom_Generation |
| **2** | 3.0 | 1958-01-23 | Female | 64.0 | Baby_Boom_Generation |
| **4** | 4.0 | 1989-11-02 | Male | 33.0 | Generation_Y |
| **5** | 5.0 | 1968-06-19 | Female | 54.0 | Generation_X |
| **7** | 6.0 | 1967-06-15 | Female | 55.0 | Generation_X |

In [8]:

```
# Merge demographics info to PRAPARE dataset
pra_new = pd.merge(pra, demo, how="left", on=['Client ID'])
pra_new.head()
```

Out[8]:

| | Client ID | Last Name | First Name | Location Name | Are you Hispanic or Latino? | Which race are you? | Migrant Work? | Armed Forces? | Lang |
|---|---|---|---|---|---|---|---|---|---|
| **0** | 2 | WATSON | SANDRA | Milestone SH (100 Beds) | No | Black/African American | No | No | Er |
| **1** | 3317 | Patton | Mary | Queens SH I - 653 | No | Black/African American | No | No | Er |
| **2** | 4360 | RODRIGUEZ | EMMANUEL | Queens SH III POP A - 654 | Yes | I choose not to answer this question | No | No | Er |
| **3** | 4361 | Litvyakov | Sergey | Lewis Ave Supported Housing | No | White | No | No | Er |
| **4** | 4363 | MABERY | SHANINE | ADULT HOME HOME SHP (62 BED) | No | Black/African American | No | No | Er |

5 rows × 29 columns

In [9]:

```
# Drop Duplicates and keep all unique clients
# Keep the most recent data

# Sort the data based on the date completed and client id
out = out.sort_values(by=['CLIENT ID','DATE COMPLETED'])

dup2 = out['CLIENT ID'].duplicated(keep = 'last')
out.drop(dup2[dup2].index, axis=0, inplace=True)
out = out.dropna(thresh = 5)

# Rename the col so as to merge later
out = out.rename(columns={'CLIENT ID':'Client ID'})
# Merge the data
out_new = pd.merge(out, demo, how="left", on=['Client ID'])
out_new.head()
```

Out[9]:

| | Client ID | CLIENT NAME | DATE OF BIRTH | LOCATION NAME | MIC# | DATE COMPLETED | POINT OF SERVICE | 1. CURRENTLY EMPLOYED | INTE WO |
|---|---|---|---|---|---|---|---|---|---|
| **0** | 2 | WATSON, SANDRA | 1958-09-23 | Milestone SH (100 Beds) | NaN | 2022-04-01 00:00:00 | Update | Yes | |
| **1** | 5 | PERSAD, KAMLAWATIE | 1968-06-19 | Milestone SH (100 Beds) | NaN | 2022-04-01 00:00:00 | Update | No | |
| **2** | 6 | SMITH, WENDY | 1967-06-15 | Emerson Scattersite OMH SH - 643 | NaN | 2021-08-10 00:00:00 | Update | No | |
| **3** | 1171 | Knight, Omar | 1972-04-09 | Brooklyn TAP I - 72 Beds | NaN | 2022-08-08 00:00:00 | Update | Yes | |
| **4** | 1256 | BROWN, ANGELIQUE | 1973-06-26 | Rockaway Parkway Center - Clinic | NaN | 2022-09-07 00:00:00 | Update | No | |

5 rows × 25 columns

In [10]:
```
# for our purpose, we only extract data in following columns
# 'Family Members' + 'Talk': people who have family members and are op
# 'HousingWorry' + 'Work' + 'Income': stress and sense of safety can v
pra_new2 = pra_new[['Family Members', 'HousingWorry', 'Work', 'Income'
pra_new2.head()
```

Out[10]:

| | Family Members | HousingWorry | Work | Income | Talk | Stress | Safe |
|---|---|---|---|---|---|---|---|
| **0** | 1 | No | Unemployed and seeking work | Less than $24,999 | 3 to 5 times a week | A little bit | Unsure |
| **1** | 0 | No | Part-time or Temporary Work | 25, 000−49,999 | Less than once a week | Somewhat | No |
| **2** | 1 | No | Otherwise Unemployed but not seeking work ( EX... | Less than $24,999 | Less than once a week | A little bit | No |
| **3** | 1 | No | Otherwise Unemployed but not seeking work ( EX... | Less than $24,999 | 3 to 5 times a week | Quite a bit | Yes |
| **4** | 1 | No | Otherwise Unemployed but not seeking work ( EX... | Less than $24,999 | 1 or 2 times a week | Not at all | Yes |

In [11]:
```
# convert all data to numbers for later use, standard of issues may ch
# set the datas with serious issues to obtain value 1

def housingworry(x):
    result = []
    for element in x:
        if 'Yes' in element:
            result.append(1)
        elif 'No' in element:
            result.append(0)
        else:
            result.append(0.5)
    return result

def work(x):
    result = []
    for element in x:
        if 'Unemployed' in element:
            result.append(1)
        elif 'choose' in element:
            result.append(0.5)
        else:
            result.append(0)
            result.append(0)
    return result

def talk(x):
    result = []
    for element in x:
        if 'Less' in element or '1' in element:
            result.append(1)
        elif 'choose' in element:
            result.append(0.5)
        else:
            result.append(0)
    return result

def family(x):
    result = []
    for element in x:
        if str(element) == '':
            result.append(1)
        elif 'self' in str(element):
            result.append(1)
        elif 'Self' in str(element):
            result.append(1)
        elif '0' in str(element) or '1' in str(element):
            result.append(1)
        else:
            result.append(0)

    return result



pra_new2['HousingWorry_num'] = housingworry(pra_new2['HousingWorry'])
pra_new2['Work_num'] = work(pra_new2['Work'])
pra_new2['Income_num'] = pra_new2['Income'].apply(lambda x: 1 if 'Less
pra_new2['Talk_num'] = talk(pra_new2['Talk'])
pra_new2['Stress_num'] = pra_new2['Stress'].apply(lambda x: 1 if 'Quit
pra_new2['Safe_num'] = pra_new2['Safe'].apply(lambda x: 0 if 'Yes' in 
pra_new2['family_num'] = family(pra_new2['Family Members'])
pra_new2 = pra_new2.drop(['Family Members', 'HousingWorry', 'Work', 'I
```

```
/var/folders/zj/36c7ylwd52b_cccy38ff01sc0000gn/T/ipykernel_6891/27227
29996.py:55: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  pra_new2['HousingWorry_num'] = housingworry(pra_new2['HousingWorry'
])
/var/folders/zj/36c7ylwd52b_cccy38ff01sc0000gn/T/ipykernel_6891/27227
29996.py:56: SettingWithCopyWarning: 
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  pra_new2['Work_num'] = work(pra_new2['Work'])
/var/folders/zj/36c7ylwd52b_cccy38ff01sc0000gn/T/ipykernel_6891/27227

29996.py:57: SettingWithCopyWarning: 
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  pra_new2['Income_num'] = pra_new2['Income'].apply(lambda x: 1 if 'L
ess' in x else 0)
/var/folders/zj/36c7ylwd52b_cccy38ff01sc0000gn/T/ipykernel_6891/27227
29996.py:58: SettingWithCopyWarning: 
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  pra_new2['Talk_num'] = talk(pra_new2['Talk'])
/var/folders/zj/36c7ylwd52b_cccy38ff01sc0000gn/T/ipykernel_6891/27227
29996.py:59: SettingWithCopyWarning: 
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  pra_new2['Stress_num'] = pra_new2['Stress'].apply(lambda x: 1 if 'Q
uite' in x or 'Very' in x else 0)
/var/folders/zj/36c7ylwd52b_cccy38ff01sc0000gn/T/ipykernel_6891/27227
29996.py:60: SettingWithCopyWarning: 
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
```

```
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  pra_new2['Safe_num'] = pra_new2['Safe'].apply(lambda x: 0 if 'Yes'
in x else 1)
/var/folders/zj/36c7ylwd52b_cccy38ff01sc0000gn/T/ipykernel_6891/27227
29996.py:61: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  pra_new2['family_num'] = family(pra_new2['Family Members'])
```

In [12]:

```
# plot
import matplotlib.pyplot as plt
df_safe = pra_new2.where(pra_new2['Safe_num']==1)
df_safe = df_safe.dropna()
print(len(df_safe))

df_stress = pra_new2.where(pra_new2['Stress_num']==1)
df_stress = df_stress.dropna()
print(len(df_stress))
```

```
195
128
```

In [13]:

```
pra_new3 = pra_new[['Client ID', 'Last Name', 'First Name', 'Family Me

pra_new3['HousingWorry_num'] = housingworry(pra_new3['HousingWorry'])
pra_new3['Work_num'] = work(pra_new3['Work'])
pra_new3['Income_num'] = pra_new3['Income'].apply(lambda x: 1 if 'Less
pra_new3['Talk_num'] = talk(pra_new3['Talk'])
pra_new3['Stress_num'] = pra_new3['Stress'].apply(lambda x: 1 if 'Quit
pra_new3['Safe_num'] = pra_new3['Safe'].apply(lambda x: 0 if 'Yes' in
pra_new3['family_num'] = family(pra_new3['Family Members'])
pra_new3 = pra_new3.drop(['Family Members', 'HousingWorry', 'Work', 'I
pra_new3
```

```
/var/folders/zj/36c7ylwd52b_cccy38ff01sc0000gn/T/ipykernel_6891/28747
39092.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
```

```
  pra_new3['HousingWorry_num'] = housingworry(pra_new3['HousingWorry'
])
/var/folders/zj/36c7ylwd52b_cccy38ff01sc0000gn/T/ipykernel_6891/28747
39092.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  pra_new3['Work_num'] = work(pra_new3['Work'])
/var/folders/zj/36c7ylwd52b_cccy38ff01sc0000gn/T/ipykernel_6891/28747
39092.py:5: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  pra_new3['Income_num'] = pra_new3['Income'].apply(lambda x: 1 if 'L
ess' in x else 0)
/var/folders/zj/36c7ylwd52b_cccy38ff01sc0000gn/T/ipykernel_6891/28747
39092.py:6: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  pra_new3['Talk_num'] = talk(pra_new3['Talk'])
/var/folders/zj/36c7ylwd52b_cccy38ff01sc0000gn/T/ipykernel_6891/28747
39092.py:7: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  pra_new3['Stress_num'] = pra_new3['Stress'].apply(lambda x: 1 if 'Q
uite' in x or 'Very' in x else 0)
/var/folders/zj/36c7ylwd52b_cccy38ff01sc0000gn/T/ipykernel_6891/28747
39092.py:8: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/panda
```

```
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  pra_new3['Safe_num'] = pra_new3['Safe'].apply(lambda x: 0 if 'Yes'
in x else 1)
/var/folders/zj/36c7ylwd52b_cccy38ff01sc0000gn/T/ipykernel_6891/28747
39092.py:9: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  pra_new3['family_num'] = family(pra_new3['Family Members'])
```

Out[13]:

| | Client ID | Last Name | First Name | HousingWorry_num | Work_num | Income_num | Talk_num |
|---|---|---|---|---|---|---|---|
| **0** | 2 | WATSON | SANDRA | 0.0 | 1.0 | 1 | 0.0 |
| **1** | 3317 | Patton | Mary | 0.0 | 0.0 | 0 | 1.0 |
| **2** | 4360 | RODRIGUEZ | EMMANUEL | 0.0 | 1.0 | 1 | 1.0 |
| **3** | 4361 | Litvyakov | Sergey | 0.0 | 1.0 | 1 | 0.0 |
| **4** | 4363 | MABERY | SHANINE | 0.0 | 1.0 | 1 | 1.0 |
| **...** | ... | ... | ... | ... | ... | ... | ... |
| **648** | 16416 | Johnson | Robin | 0.0 | 1.0 | 1 | 0.0 |
| **649** | 16447 | Bisogno | Thomas | 0.0 | 1.0 | 1 | 0.0 |
| **650** | 16480 | Grant | Pamela | 0.0 | 1.0 | 1 | 1.0 |
| **651** | 16580 | DELFINO | LOUIS | 0.0 | 1.0 | 0 | 1.0 |
| **652** | 16581 | LUI | KWOKPO | 0.0 | 1.0 | 0 | 0.0 |

653 rows × 10 columns

In [14]:
```
# divide people into groups where each maintain the ones having most s
df_serious_housing = pra_new3[pra_new3['HousingWorry_num']==1]
print('serious housing count', len(df_serious_housing))
df_serious_work = pra_new3[pra_new3['Work_num']==1]
print('serious work count', len(df_serious_work))
df_serious_income = pra_new3[pra_new3['Income_num']==1]
print('serious income count', len(df_serious_income))
df_serious_talk = pra_new3[pra_new3['Talk_num']==1]
print('serious talk count', len(df_serious_talk))
df_serious_stress = pra_new3[pra_new3['Stress_num']==1]
print('serious stress count', len(df_serious_stress))
df_serious_safe = pra_new3[pra_new3['Safe_num']==1]
print('serious safe count', len(df_serious_safe))
df_serious_family = pra_new3[pra_new3['family_num']==1]
print('serious family count', len(df_serious_family))
```

```
serious housing count 74
serious work count 559
serious income count 410
serious talk count 294
serious stress count 128
serious safe count 195
serious family count 594
```

In [15]:
```
# for each group of people, analyze their program and location by merg
demo = pd.read_excel('Demographics.xlsx')
demo2 = pd.read_excel('served list all 09302022 (1).xlsx')
# print(demo.columns.tolist())
demo = demo[['CLIENTID', 'CLIENTNAME', 'LOCATIONNAME', 'LOCATIONSTARTD
demo2 = demo2[['CLIENTID', 'CLIENTNAME', 'LOCATIONNAME', 'LOCATIONFIXE
# demo = demo[pd.notnull(demo['LOCATIONNAME'])]
merge_housing = df_serious_housing.merge(demo2, how='left',left_on='Cl
merge_work = df_serious_work.merge(demo2, how='left',left_on='Client I
merge_income = df_serious_income.merge(demo2, how='left',left_on='Clie
merge_talk = df_serious_talk.merge(demo2, how='left',left_on='Client I
merge_stress = df_serious_stress.merge(demo2, how='left',left_on='Clie
merge_safe = df_serious_safe.merge(demo2, how='left',left_on='Client I
merge_family = df_serious_family.merge(demo2, how='left',left_on='Clie
```

In [16]:

```
# Sort the data based on the date completed and client id(Housing)
merge_housing = merge_housing.sort_values(by=['LOCATIONNAME','LOCATION

dup3 = merge_housing['Client ID'].duplicated(keep = 'last')
merge_housing.drop(dup3[dup3].index, axis=0, inplace=True)
merge_housing = merge_housing.dropna(thresh = 5)

# Sort the data based on the date completed and client id(Work)
merge_work = merge_work.sort_values(by=['LOCATIONNAME','LOCATIONSTARTD

dup3 = merge_work['Client ID'].duplicated(keep = 'last')
merge_work.drop(dup3[dup3].index, axis=0, inplace=True)
merge_work = merge_work.dropna(thresh = 5)

# Sort the data based on the date completed and client id(Income)
merge_income = merge_income.sort_values(by=['LOCATIONNAME','LOCATIONST

dup3 = merge_income['Client ID'].duplicated(keep = 'last')
merge_income.drop(dup3[dup3].index, axis=0, inplace=True)
merge_income = merge_income.dropna(thresh = 5)

# Sort the data based on the date completed and client id(Talk)
merge_talk = merge_talk.sort_values(by=['LOCATIONNAME','LOCATIONSTARTD

dup3 = merge_talk['Client ID'].duplicated(keep = 'last')
merge_talk.drop(dup3[dup3].index, axis=0, inplace=True)
merge_talk = merge_talk.dropna(thresh = 5)

# Sort the data based on the date completed and client id(Stress)
merge_stress = merge_stress.sort_values(by=['LOCATIONNAME','LOCATIONST

dup3 = merge_stress['Client ID'].duplicated(keep = 'last')
merge_stress.drop(dup3[dup3].index, axis=0, inplace=True)
merge_stress = merge_stress.dropna(thresh = 5)

# Sort the data based on the date completed and client id(Safe)
merge_safe = merge_safe.sort_values(by=['LOCATIONNAME','LOCATIONSTARTD

dup3 = merge_safe['Client ID'].duplicated(keep = 'last')
merge_safe.drop(dup3[dup3].index, axis=0, inplace=True)
merge_safe = merge_safe.dropna(thresh = 5)

# Sort the data based on the date completed and client id(Family)
merge_family = merge_family.sort_values(by=['LOCATIONNAME','LOCATIONST

dup3 = merge_family['Client ID'].duplicated(keep = 'last')
merge_family.drop(dup3[dup3].index, axis=0, inplace=True)
merge_family = merge_family.dropna(thresh = 5)
```

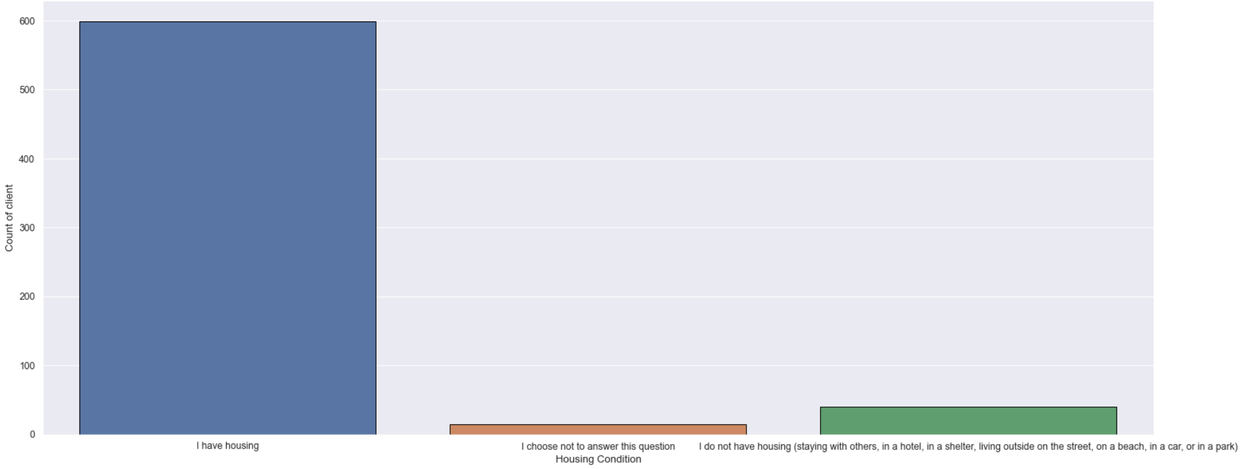
# Part 2 EDA

In this part, I will try to visualize the distribution of a few important variables so as to have a brief understand of the data set

In [17]:

```
rcParams['figure.figsize'] = 25,10

sns.set(font_scale=1.1)
sns.countplot(data=pra_new, x='Housing',edgecolor = 'black')
plt.xlabel("Housing Condition")
plt.ylabel("Count of client")

# Blue: I have housing
# Orange: I choose not to anser this question
# Green: I do not have housing

print('Number of people who have housing:' + str(len(pra_new[pra_new['
print('Number of people who did not answer:' + str(len(pra_new[pra_new
print('Number of people who have no housing:' + str(len(pra_new[pra_ne
print('Majority people have housing')
```

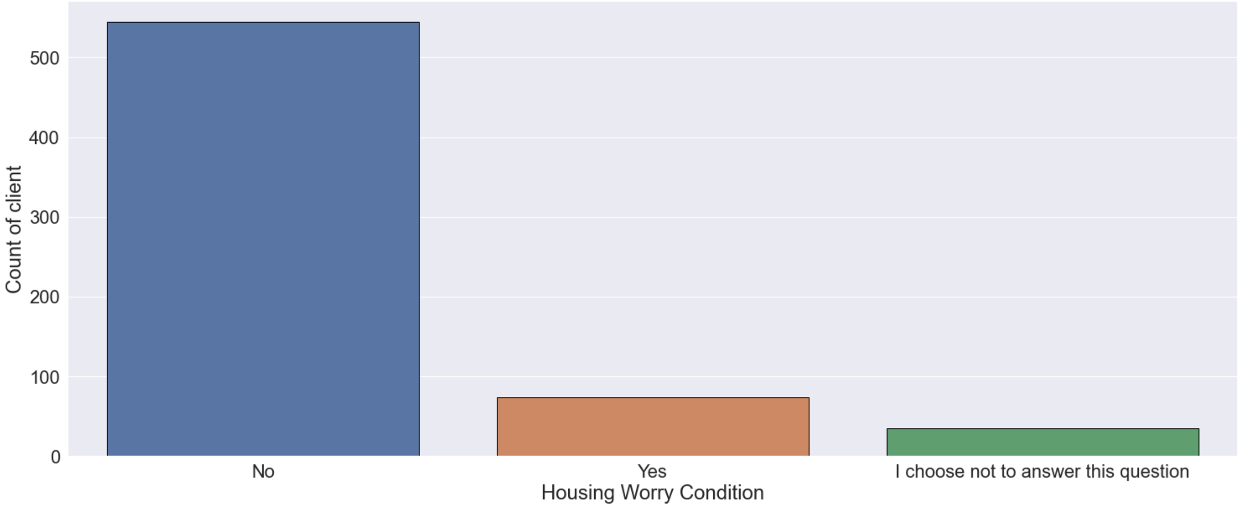
```
Number of people who have housing:599(91.73%)
Number of people who did not answer:14(2.14%)
Number of people who have no housing:40(6.13%)
Majority people have housing
```



In [18]:

```
sns.set(font_scale=2)
sns.countplot(data=pra_new, x='HousingWorry',edgecolor = 'black')
plt.xlabel("Housing Worry Condition")
plt.ylabel("Count of client")


print('Number of people who did not worry about housing:' + str(len(pr
print('Number of people who worry abuot housing:' + str(len(pra_new[pr
print('Number of people who did not answer:' + str(len(pra_new[pra_new
print('Majority people have no worry about housing, which is consisten
```

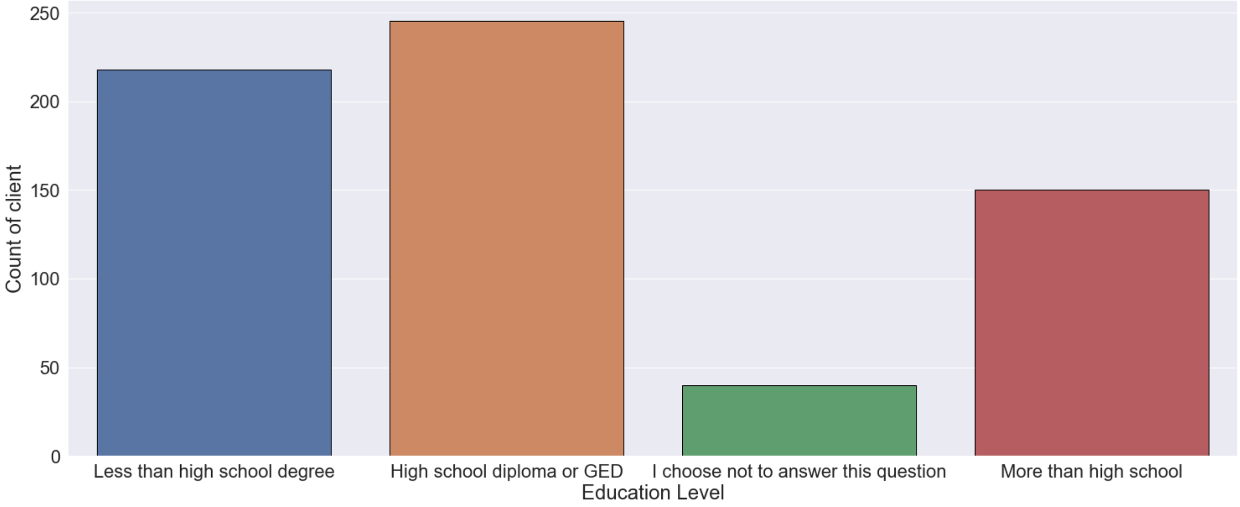
```
Number of people who did not worry about housing:544(83.31%)
Number of people who worry abuot housing:74(11.33%)
Number of people who did not answer:35(5.36%)
Majority people have no worry about housing, which is consistent with
housing condition
```



In [19]:

```
sns.set(font_scale=2)
sns.countplot(data=pra_new, x='Education',edgecolor = 'black')
plt.xlabel("Education Level")
plt.ylabel("Count of client")

print('Number of people who received Less than high school degree:' + 
print('Number of people who received High school diploma or GED:' + st
print('Number of people who did not answer:' + str(len(pra_new[pra_new
print('Number of people who received more than high school:' + str(len
print('More than 70% of people received education at high school or lo
```

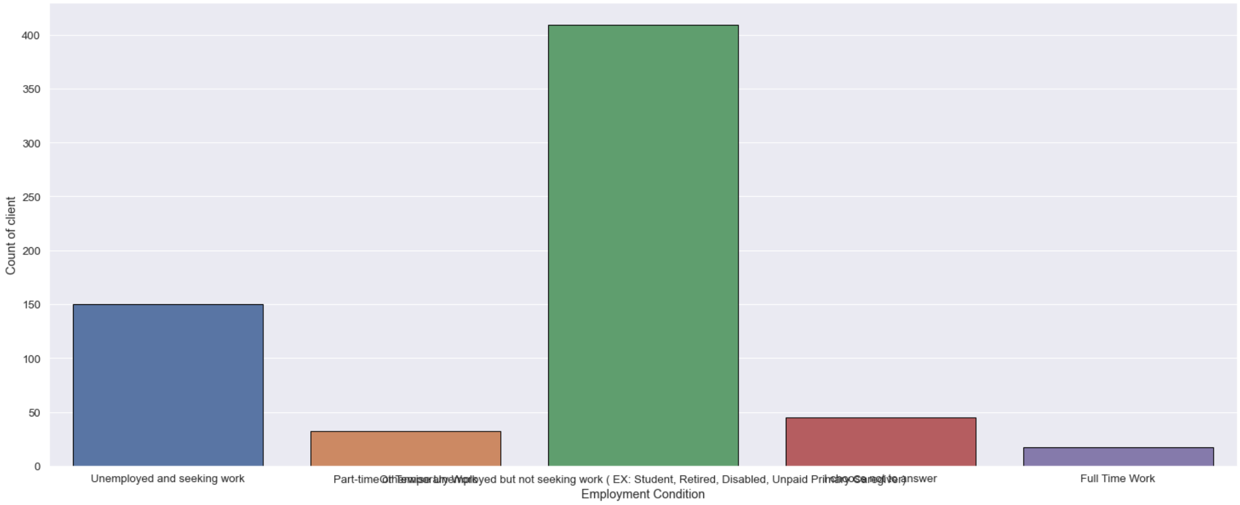
```
Number of people who received Less than high school degree:218(33.38%
)
Number of people who received High school diploma or GED:245(37.52%)
Number of people who did not answer:40(6.13%)
Number of people who received more than high school:150(22.97%)
More than 70% of people received education at high school or lower
```



In [20]:

```
sns.set(font_scale=1.2)
sns.countplot(data=pra_new, x='Work',edgecolor = 'black')
plt.xlabel("Employment Condition")
plt.ylabel("Count of client")

# Blue: Unemployed and seeking work
# Brown: Part-time or Temporary Work
# Green: Otherwise Unemployed but not seeking work ( EX: Student, Reti
# Red: I choose not to answer
# Purple: Full Time Work

print('Number of people who are Unemployed and seeking work:' + str(le
print('Number of people who have Part-time or Temporary Work:' + str(l
print('Number of people who are Unemployed but not seeking work:' + st
print('Number of people who did not answer:' + str(len(pra_new[pra_new
print('Number of people who have Full time work:' + str(len(pra_new[pr
print('Based on the graph and data, there are more then 60 percent peo
```

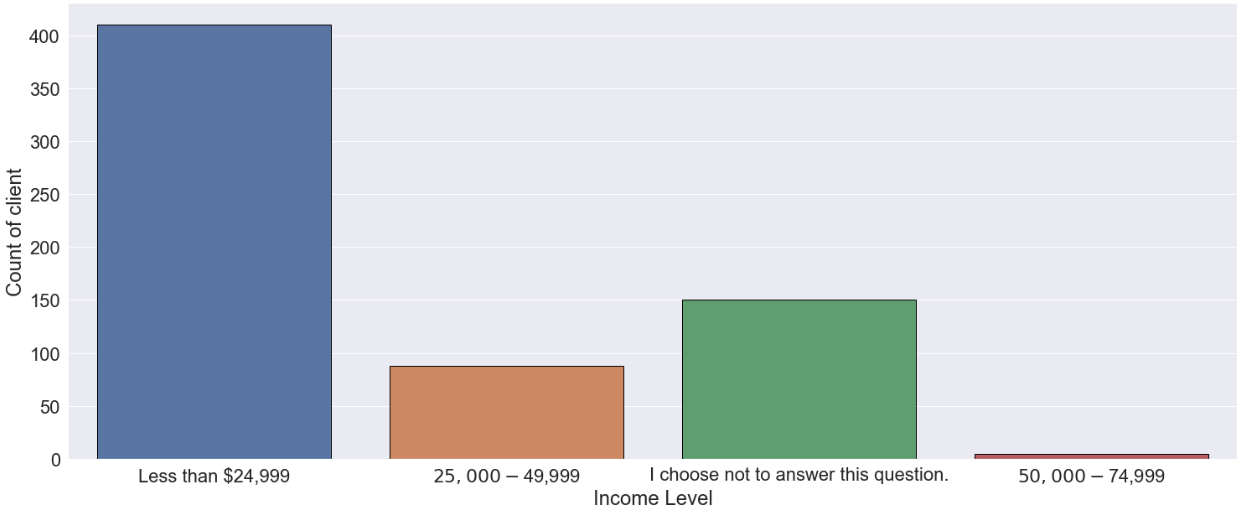
```
Number of people who are Unemployed and seeking work:150(22.97%)
Number of people who have Part-time or Temporary Work:32(4.9%)
Number of people who are Unemployed but not seeking work:409(62.63%)
Number of people who did not answer:45(6.89%)
Number of people who have Full time work:17(2.6%)
Based on the graph and data, there are more then 60 percent people wh
o are consided as Discouraged worker
```



In [21]:

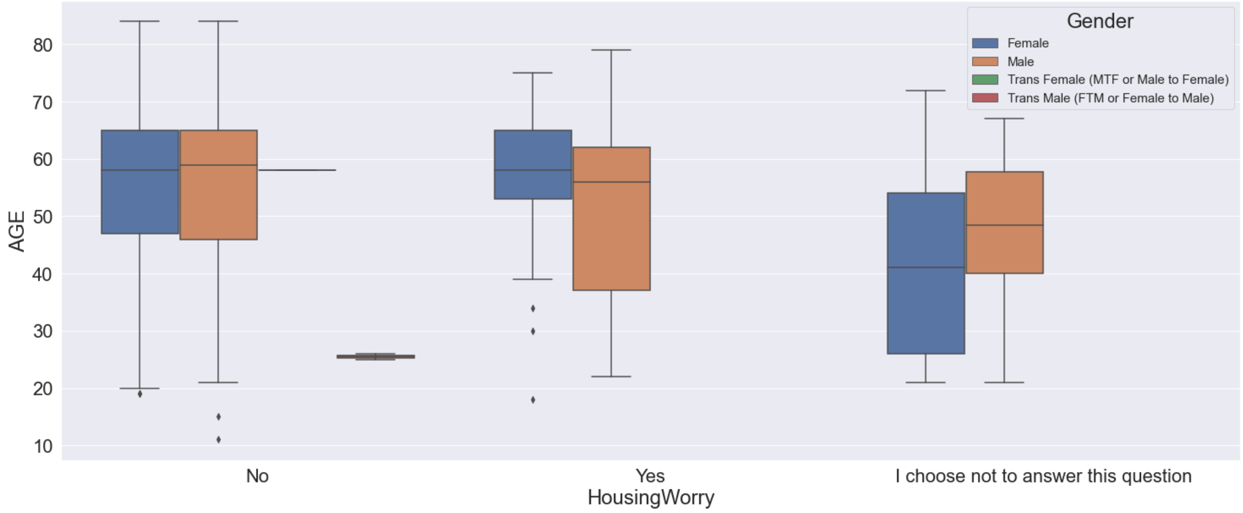
```
sns.set(font_scale=2)
sns.countplot(data=pra_new, x='Income',edgecolor = 'black')
plt.xlabel("Income Level")
plt.ylabel("Count of client")

print('Number of people who received Less than $24,999:' + str(len(pra
print('Number of people who received $25,000 - $49,999:' + str(len(pra
print('Number of people who did not answer:' + str(len(pra_new[pra_new
print('Number of people who received more than $50,000:' + str(len(pra
print('Consider the 2022 Federal Poverty Level, the average number of
```

```
Number of people who received Less than $24,999:410(62.79%)
Number of people who received $25,000 - $49,999:88(13.48%)
Number of people who did not answer:150(22.97%)
Number of people who received more than $50,000:5(0.77%)
Consider the 2022 Federal Poverty Level, the average number of family
member in PRAPARE is 0.89,
the poverty line is $13,590 and the low income level is $31,300.
Therefore, majority peole are considered as low income.
```

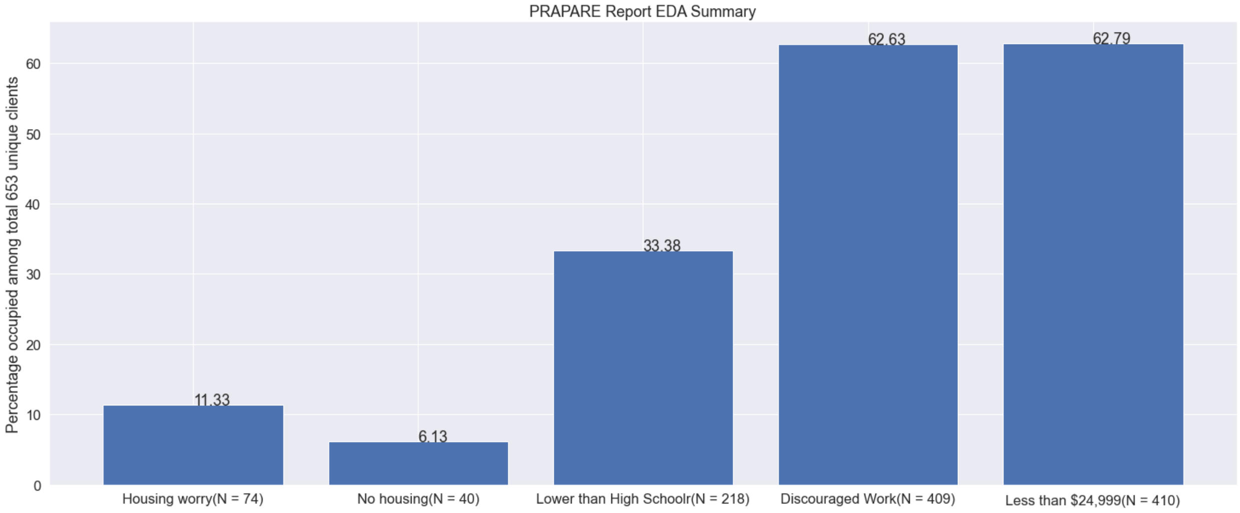


In [22]:
```
rcParams['figure.figsize'] = 25,10
sns.boxplot(data=pra_new , x="HousingWorry",y = "AGE", hue="GENDER")
plt.legend(title='Gender', loc='upper right', prop={'size': 15})
print('Focusing on the group of "No", the age distribution is almost s
```

```
Focusing on the group of "No", the age distribution is almost same ac
ross gender
```



In [23]:
```
def addlabels(x,y):
    for i in range(len(x)):
        plt.text(i,y[i],y[i])

sns.set(font_scale=1.5)
if __name__ == '__main__':
    # creating data on which bar chart will be plot
    x = ["Housing worry(N = 74)", "No housing(N = 40)", "Lower than Hi
        "Discouraged Work(N = 409)", "Less than $24,999(N = 410)"]
    y = [11.33,6.13,33.38,62.63,62.79]

    # making the bar chart on the data
    plt.bar(x, y)

    # calling the function to add value labels
    addlabels(x, y)

    # giving title to the plot
    plt.title("PRAPARE Report EDA Summary")

    # giving Y labels
    plt.ylabel("Percentage occupied among total 653 unique clients")

    # visualizing the plot
    plt.show()
```

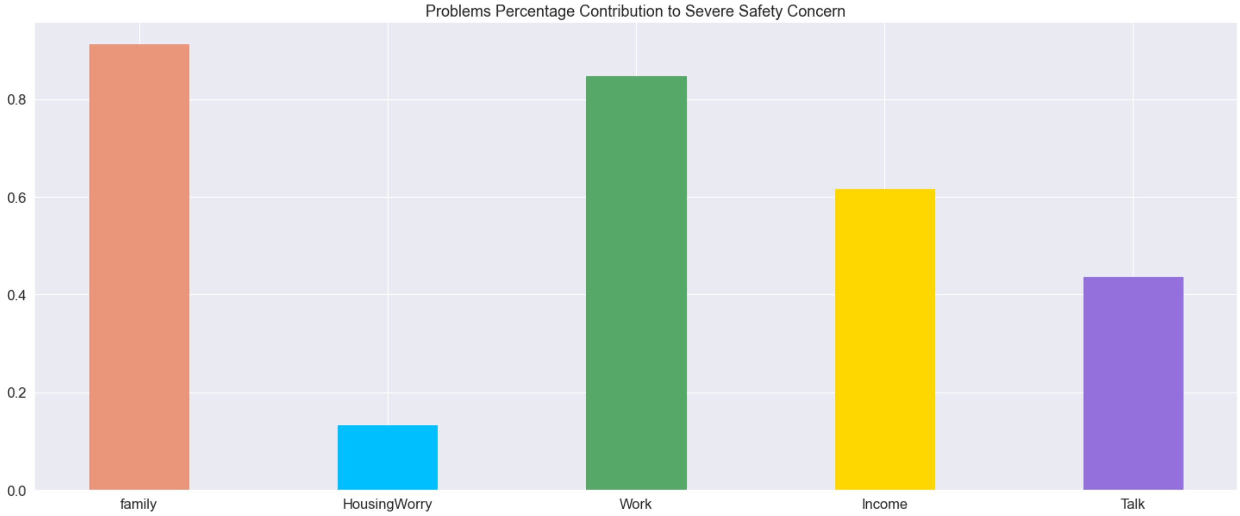


## Part3 Deeper Analysis

#### ***'Family Members' + 'Talk': people who have family members and are open to communication tend to bear less pressure***

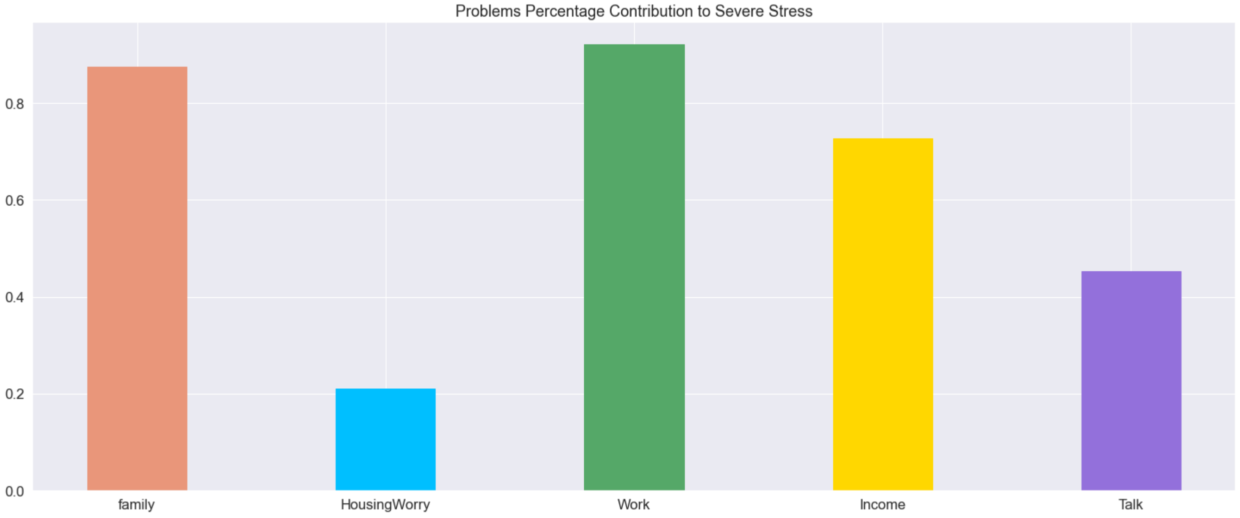
#### ***'HousingWorry' + 'Work' + 'Income': stress and sense of safety can vary based on these categories often***

In [24]:
```
# plot the corresponding issues percentage that's under safety concern

# Selecting people who have safety concern
# The bar represents the percentage contributed to the safety concern
total_n = len(df_safe)
y1 = sum(df_safe['family_num']==1)/total_n
y2 = sum(df_safe['HousingWorry_num']==1)/total_n
y3 = sum(df_safe['Work_num']==1)/total_n
y4 = sum(df_safe['Income_num']==1)/total_n
y5 = sum(df_safe['Talk_num']==1)/total_n
y_safe = [y1, y2, y3, y4, y5]
x = list(range(5))
barlist = plt.bar(x, y_safe, width = 0.4)
barlist[0].set_color('darksalmon')
barlist[1].set_color('deepskyblue')
barlist[2].set_color('g')
barlist[3].set_color('gold')
barlist[4].set_color('mediumpurple')
plt.title('Problems Percentage Contribution to Severe Safety Concern')
plt.xticks(x, ['family', 'HousingWorry', 'Work', 'Income', 'Talk'])
plt.show()
```



In [25]:

```
# plot the corresponding issues percentage that's under stress concern

# Selecting people who have stress concern
# The bar represents the percentage contributed to the stress concern
total_n = len(df_stress)
y1 = sum(df_stress['family_num']==1)/total_n
y2 = sum(df_stress['HousingWorry_num']==1)/total_n
y3 = sum(df_stress['Work_num']==1)/total_n
y4 = sum(df_stress['Income_num']==1)/total_n
y5 = sum(df_stress['Talk_num']==1)/total_n
y_stress = [y1, y2, y3, y4, y5]
x = list(range(5))
barlist = plt.bar(x, y_stress, width = 0.4)
barlist[0].set_color('darksalmon')
barlist[1].set_color('deepskyblue')
barlist[2].set_color('g')
barlist[3].set_color('gold')
barlist[4].set_color('mediumpurple')

plt.title('Problems Percentage Contribution to Severe Stress')
plt.xticks(x, ['family', 'HousingWorry', 'Work', 'Income', 'Talk'])
plt.show()
```



In [26]:
```
merge_housing
```

Out[26]:

| | Client ID | Last Name | First Name | HousingWorry_num | Work_num | Income_num | Talk_num |
|---|---|---|---|---|---|---|---|
| **58** | 9817 | PAGAN | VANESSA | 1.0 | 1.0 | 1 | 0.0 |
| **14** | 4551 | PENA | MARIA | 1.0 | 1.0 | 1 | 0.0 |
| **15** | 4553 | ROSENBLATT | BONNIE | 1.0 | 1.0 | 0 | 1.0 |
| **13** | 4538 | TALBERT | ANDRE | 1.0 | 1.0 | 1 | 0.0 |
| **16** | 4558 | ALBANO | RAYMOND | 1.0 | 1.0 | 1 | 1.0 |
| **...** | ... | ... | ... | ... | ... | ... | ... |
| **79** | 15149 | Yormark | Gary | 1.0 | 1.0 | 1 | 0.0 |
| **80** | 15183 | Rizzo | Allison | 1.0 | 1.0 | 1 | 1.0 |
| **85** | 15270 | ROBERTSON | SHELLY | 1.0 | 1.0 | 0 | 0.0 |
| **86** | 15515 | MILES | WILLIAM | 1.0 | 1.0 | 0 | 1.0 |
| **87** | 15569 | ESCALERABELL | AZARIA | 1.0 | 1.0 | 0 | 0.0 |

74 rows × 17 columns

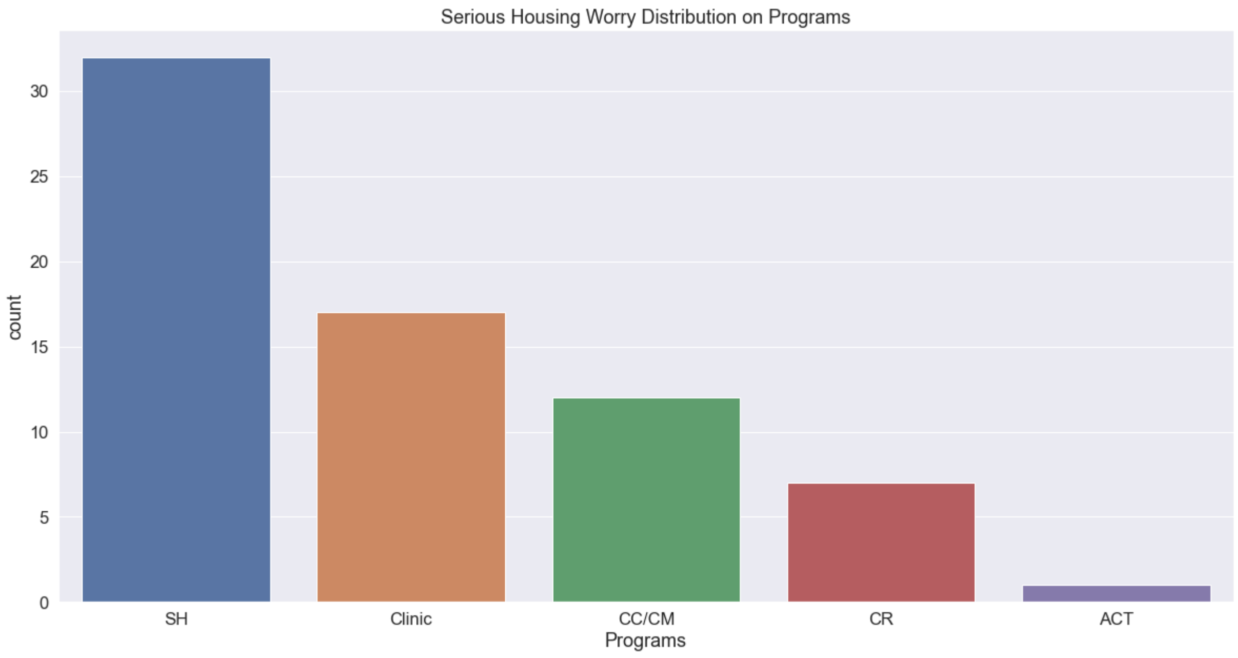
In [27]:
```
str(round(len(merge_housing[merge_housing['LOCATIONNAME'] == 'RTS'])/7
```

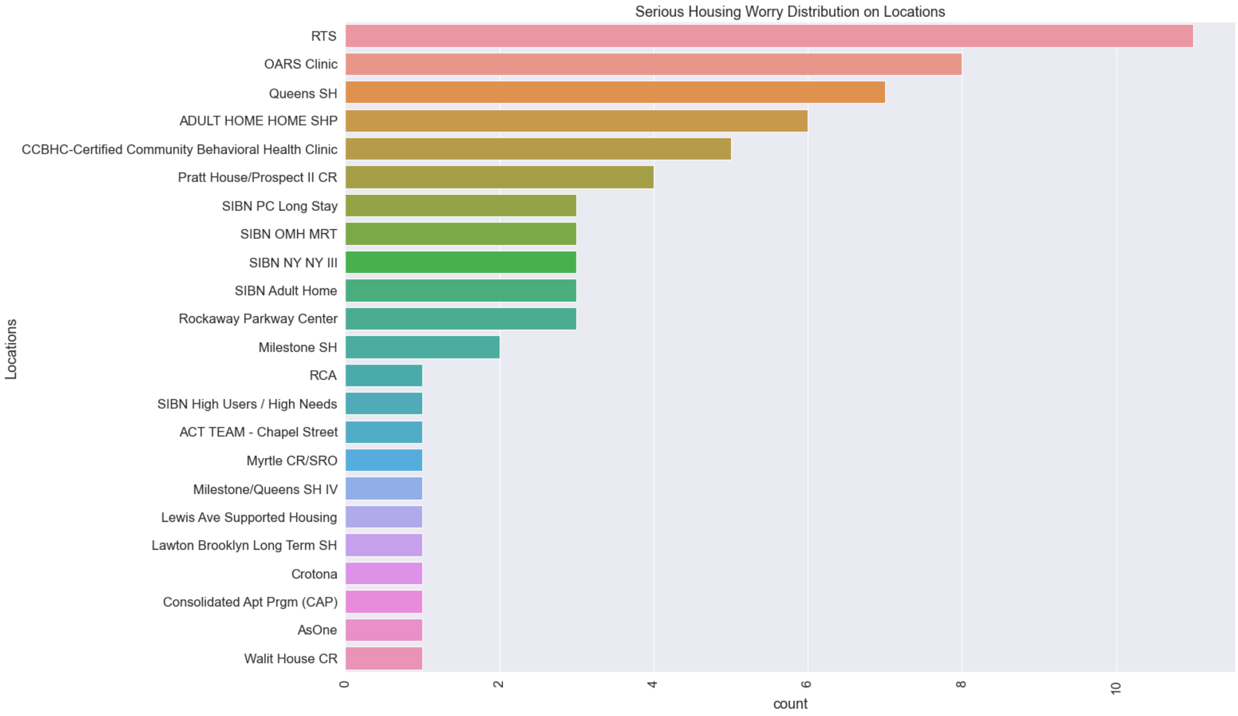
Out[27]:
```
'15.0'
```

In [28]:
```

```

```
# For housing, show the portion of location and Type
tmp1_LOCATIONAME = merge_housing.groupby(['LOCATIONFIXED'])['LOCATIONF
tmp1_Type = merge_housing.groupby(['TYPEFIXED'])['TYPEFIXED'].count().
# Plot the locationame and Type distribution using pie chart
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np

print('74 out of 653 people have serious housing worry. And ' + str(le
      '('+ str(round(len(merge_housing[merge_housing['TYPEFIXED'] == '
     +str(len(merge_housing[merge_housing['LOCATIONFIXED'] == 'RTS']))

from matplotlib import rcParams
rcParams['figure.figsize'] = 20,10
tmp1_Type['TYPEFIXED'] = tmp1_Type['TYPEFIXED'].astype(str).replace('\
ax = sns.barplot(data=tmp1_Type, x="TYPEFIXED", y="count")
plt.xlabel('Programs')
plt.title('Serious Housing Worry Distribution on Programs')
plt.show()

rcParams['figure.figsize'] = 20,15
ax = sns.barplot( y="LOCATIONFIXED", x="count",data=tmp1_LOCATIONAME,)
plt.xticks(rotation=90)
plt.ylabel('Locations')
plt.title('Serious Housing Worry Distribution on Locations')
plt.show()
```

```
74 out of 653 people have serious housing worry. And 32(43.0%) of the
m are in SH. However RTS(CC/CM) has most
people who have serious Housing Worry, which is 11(15.0%)
```

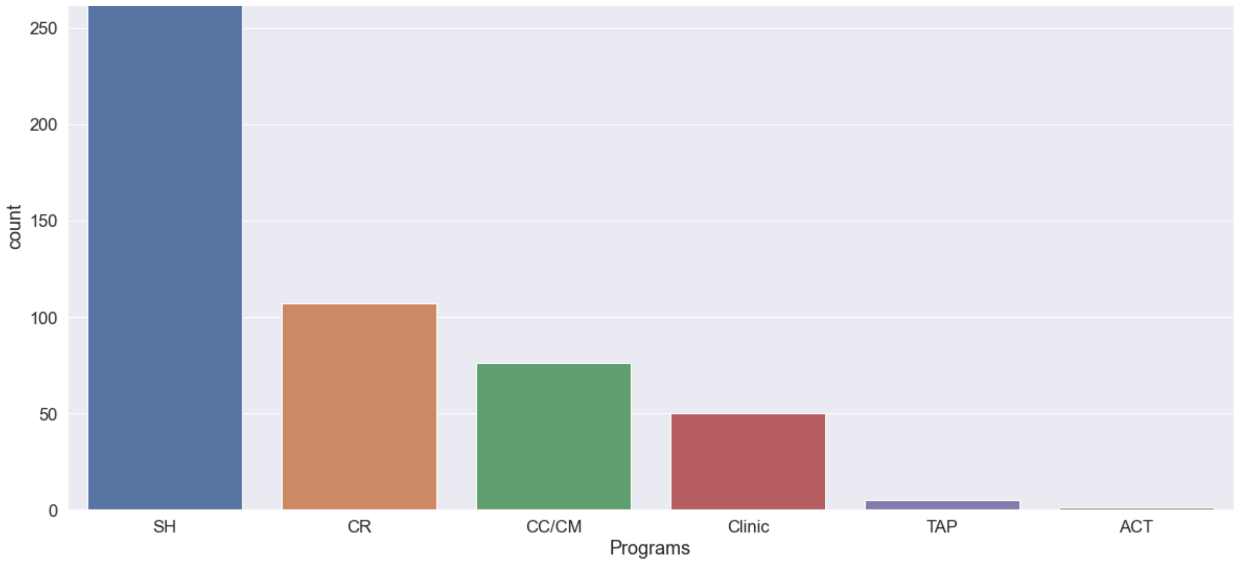


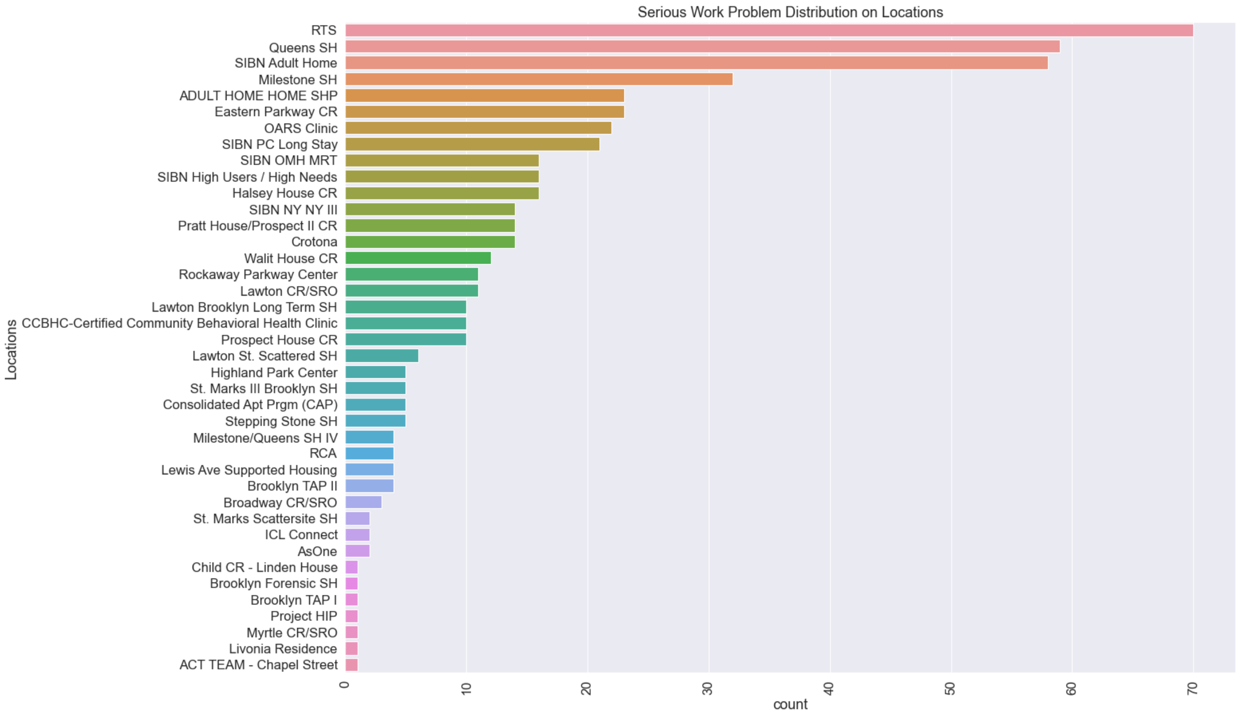


In [29]:

```
# For work
tmp1_LOCATIONAME = merge_work.groupby(['LOCATIONFIXED'])['LOCATIONFIXE
tmp1_Type = merge_work.groupby(['TYPEFIXED'])['TYPEFIXED'].count().sor
# Plot the locationame and Type distribution using pie chart
print('559 out of 653 people have serious work problem. And ' + str(le
      '('+ str(round(len(merge_work[merge_work['TYPEFIXED'] == 'SH'])/
     +str(len(merge_work[merge_work['LOCATIONFIXED'] == 'RTS'])) +'('+

from matplotlib import rcParams
rcParams['figure.figsize'] = 20,10
tmp1_Type['TYPEFIXED'] = tmp1_Type['TYPEFIXED'].astype(str).replace('\
ax = sns.barplot(data=tmp1_Type, x="TYPEFIXED", y="count")
plt.xlabel('Programs')
plt.title('Serious Work Problem Distribution on Programs')
plt.show()

rcParams['figure.figsize'] = 20,15
ax = sns.barplot( y="LOCATIONFIXED", x="count",data=tmp1_LOCATIONAME,)
plt.xticks(rotation=90)
plt.ylabel('Locations')
plt.title('Serious Work Problem Distribution on Locations')
plt.show()
```

```
559 out of 653 people have serious work problem. And 281(50.0%) of th
em are in SH. However RTS(CC/CM) has most
people who have serious work problem, which is 70(13.0%)
```

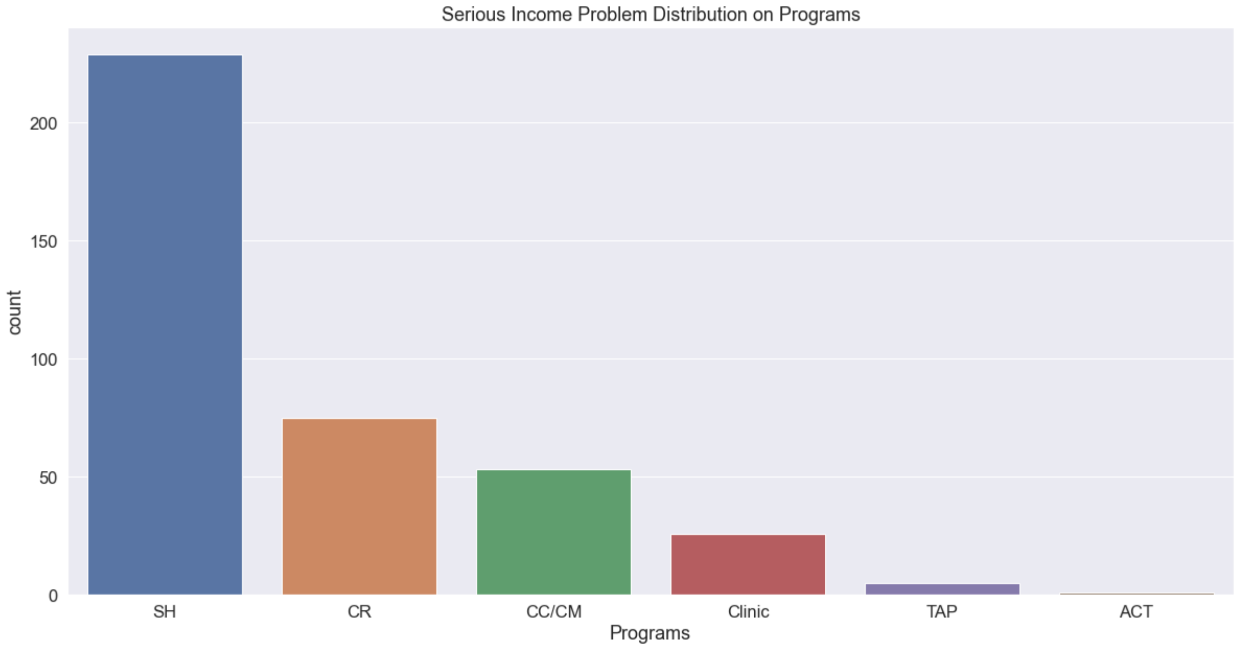

250
200
150
100
50
0
count
SH
CR
CC/CM
Clinic
TAP
ACT
Programs

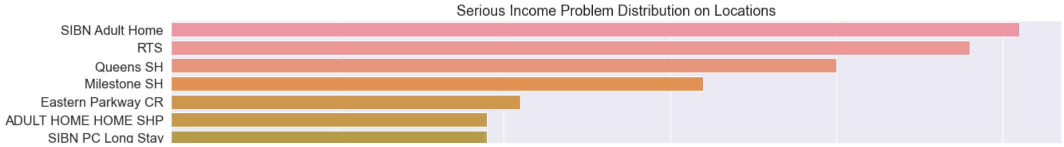

Serious Work Problem Distribution on Locations
RTS
Queens SH
SIBN Adult Home
Milestone SH
ADULT HOME HOME SHP
Eastern Parkway CR
OARS Clinic
SIBN PC Long Stay
SIBN OMH MRT
SIBN High Users / High Needs
Halsey House CR
SIBN NY NY III
Pratt House/Prospect II CR
Crotona
Walit House CR
Rockaway Parkway Center
Lawton CR/SRO
Lawton Brooklyn Long Term SH
CCBHC-Certified Community Behavioral Health Clinic
Prospect House CR
Lawton St. Scattered SH
Highland Park Center
St. Marks III Brooklyn SH
Consolidated Apt Prgm (CAP)
Stepping Stone SH
Milestone/Queens SH IV
RCA
Lewis Ave Supported Housing
Brooklyn TAP II
Broadway CR/SRO
St. Marks Scattersite SH
ICL Connect
AsOne
Child CR - Linden House
Brooklyn Forensic SH
Brooklyn TAP I
Project HIP
Myrtle CR/SRO
Livonia Residence
ACT TEAM - Chapel Street
Locations
0
10
20
30
40
50
60
70
count

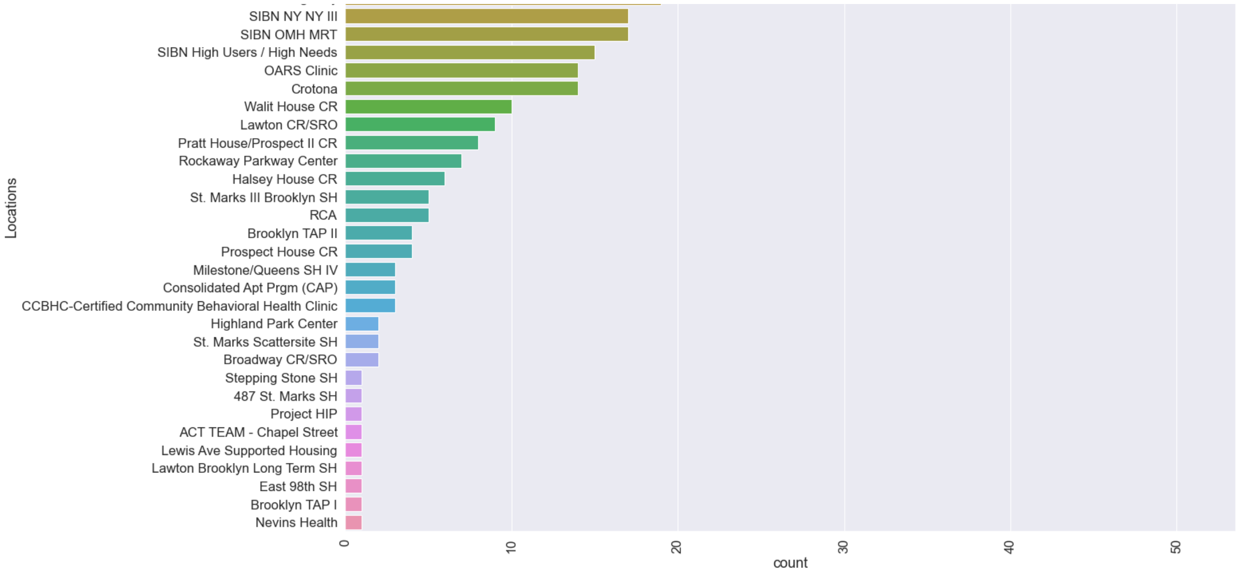
In [30]:

```
# For Income
tmp1_LOCATIONAME = merge_income.groupby(['LOCATIONFIXED'])['LOCATIONFI
tmp1_Type = merge_income.groupby(['TYPEFIXED'])['TYPEFIXED'].count().s
# Plot the locationame and Type distribution using pie chart
print('410 out of 653 people have serious income problem. And ' + str(
      '('+ str(round(len(merge_income[merge_income['TYPEFIXED'] == 'SH
     +str(len(merge_income[merge_income['LOCATIONFIXED'] == 'SIBN Adul

from matplotlib import rcParams
rcParams['figure.figsize'] = 20,10
tmp1_Type['TYPEFIXED'] = tmp1_Type['TYPEFIXED'].astype(str).replace('\
ax = sns.barplot(data=tmp1_Type, x="TYPEFIXED", y="count")
plt.xlabel('Programs')
plt.title('Serious Income Problem Distribution on Programs')
plt.show()

rcParams['figure.figsize'] = 20,15
ax = sns.barplot( y="LOCATIONFIXED", x="count",data=tmp1_LOCATIONAME,)
plt.xticks(rotation=90)
plt.ylabel('Locations')
plt.title('Serious Income Problem Distribution on Locations')
plt.show()
```

```
410 out of 653 people have serious income problem. And 229(56.0000000
0000001%) of them are in SH.
And among all SH programs, SIBN Adult Home has most people who have s
erious income problem, which is 51(22.0%) out of 229 people in SH
```





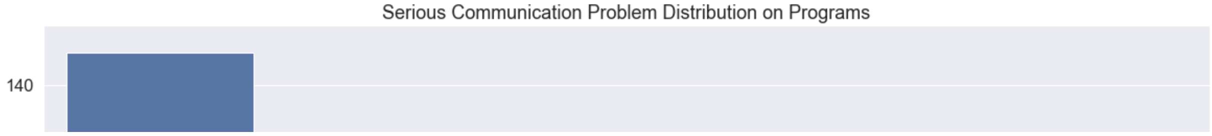


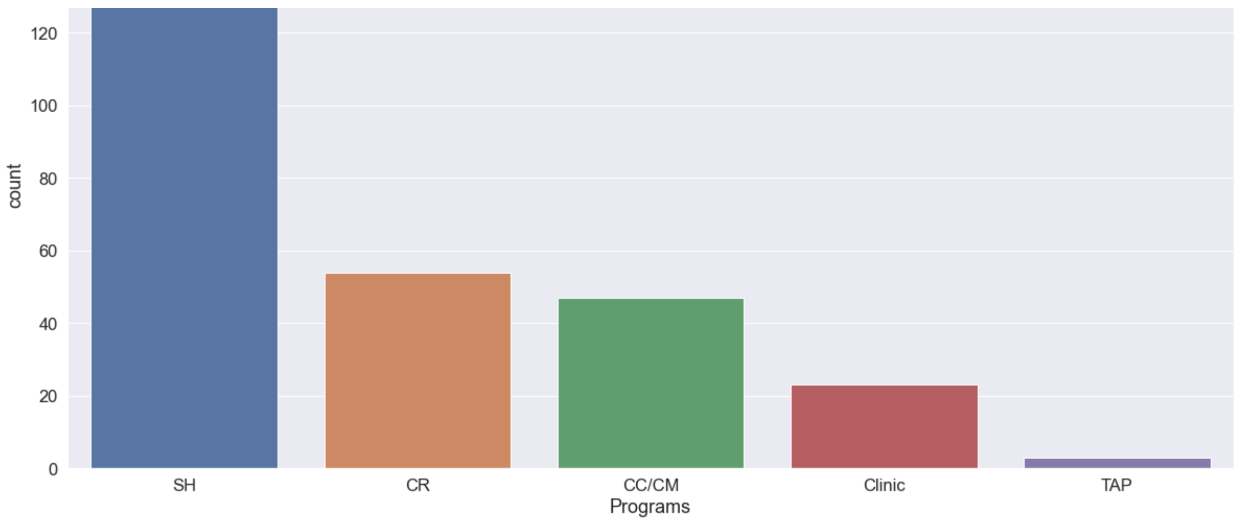
In [31]:

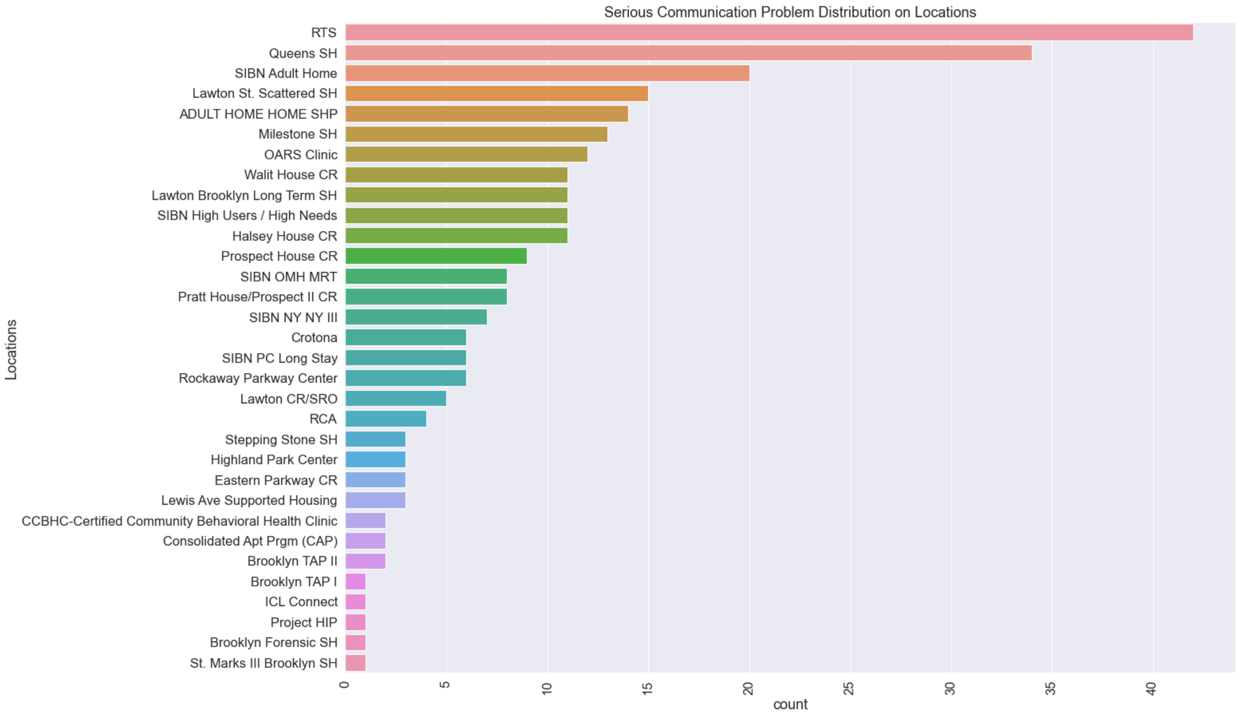
```
# For Talk
tmp1_LOCATIONAME = merge_talk.groupby(['LOCATIONFIXED'])['LOCATIONFIXE
tmp1_Type = merge_talk.groupby(['TYPEFIXED'])['TYPEFIXED'].count().sor
# Plot the locationame and Type distribution using pie chart

print('294 out of 653 people have serious communication problem. And '
      '('+ str(round(len(merge_talk[merge_talk['TYPEFIXED'] == 'SH'])/
     +str(len(merge_talk[merge_talk['LOCATIONFIXED'] == 'RTS'])) +'('+


from matplotlib import rcParams
rcParams['figure.figsize'] = 20,10
tmp1_Type['TYPEFIXED'] = tmp1_Type['TYPEFIXED'].astype(str).replace('\
ax = sns.barplot(data=tmp1_Type, x="TYPEFIXED", y="count")
plt.xlabel('Programs')
plt.title('Serious Communication Problem Distribution on Programs')
plt.show()

rcParams['figure.figsize'] = 20,15
ax = sns.barplot( y="LOCATIONFIXED", x="count",data=tmp1_LOCATIONAME,)
plt.xticks(rotation=90)
plt.ylabel('Locations')
plt.title('Serious Communication Problem Distribution on Locations')
plt.show()
```

```
294 out of 653 people have serious communication problem. And 149(51.
0%) of them are in SH.
However RTS(CC/CM) has most people who have serious communication pro
blem, which is 42(14.000000000000002%)
```

Serious Communication Problem Distribution on Programs



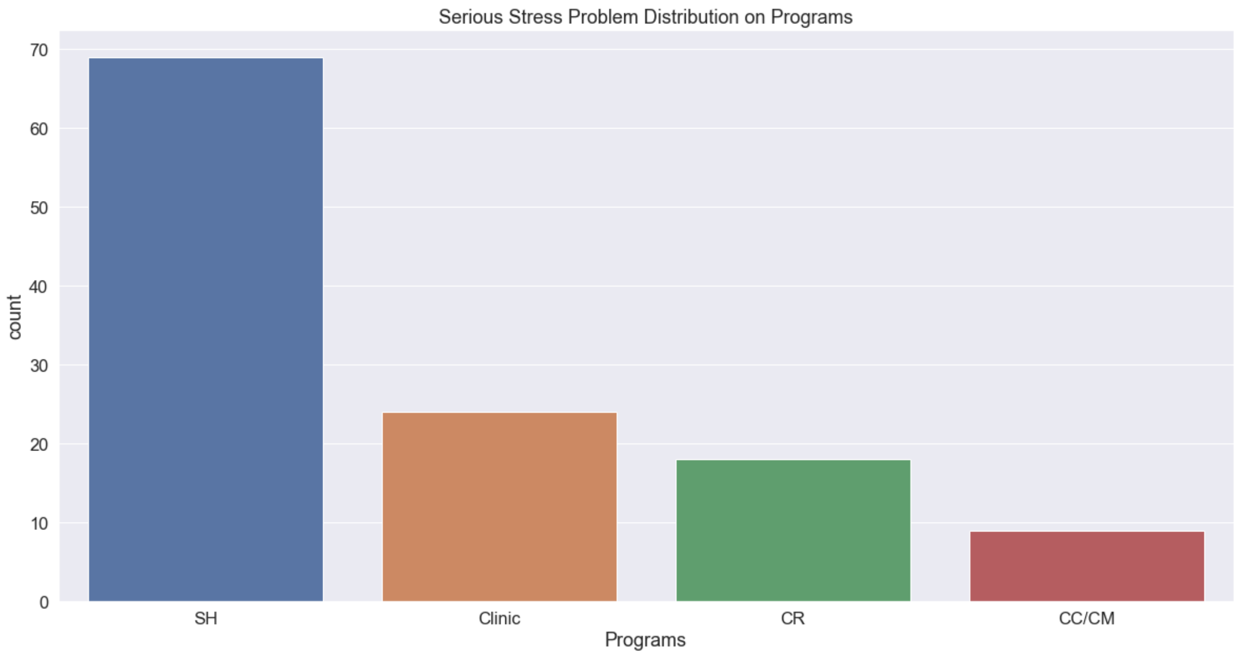

count
120
100
80
60
40
20
0
SH
CR
CC/CM
Clinic
TAP
Programs

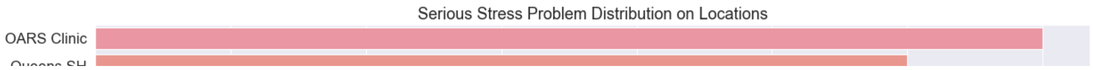

Serious Communication Problem Distribution on Locations
Locations
RTS
Queens SH
SIBN Adult Home
Lawton St. Scattered SH
ADULT HOME HOME SHP
Milestone SH
OARS Clinic
Walit House CR
Lawton Brooklyn Long Term SH
SIBN High Users / High Needs
Halsey House CR
Prospect House CR
SIBN OMH MRT
Pratt House/Prospect II CR
SIBN NY NY III
Crotona
SIBN PC Long Stay
Rockaway Parkway Center
Lawton CR/SRO
RCA
Stepping Stone SH
Highland Park Center
Eastern Parkway CR
Lewis Ave Supported Housing
CCBHC-Certified Community Behavioral Health Clinic
Consolidated Apt Prgm (CAP)
Brooklyn TAP II
Brooklyn TAP I
ICL Connect
Project HIP
Brooklyn Forensic SH
St. Marks III Brooklyn SH
0
5
10
15
20
25
30
35
40
count

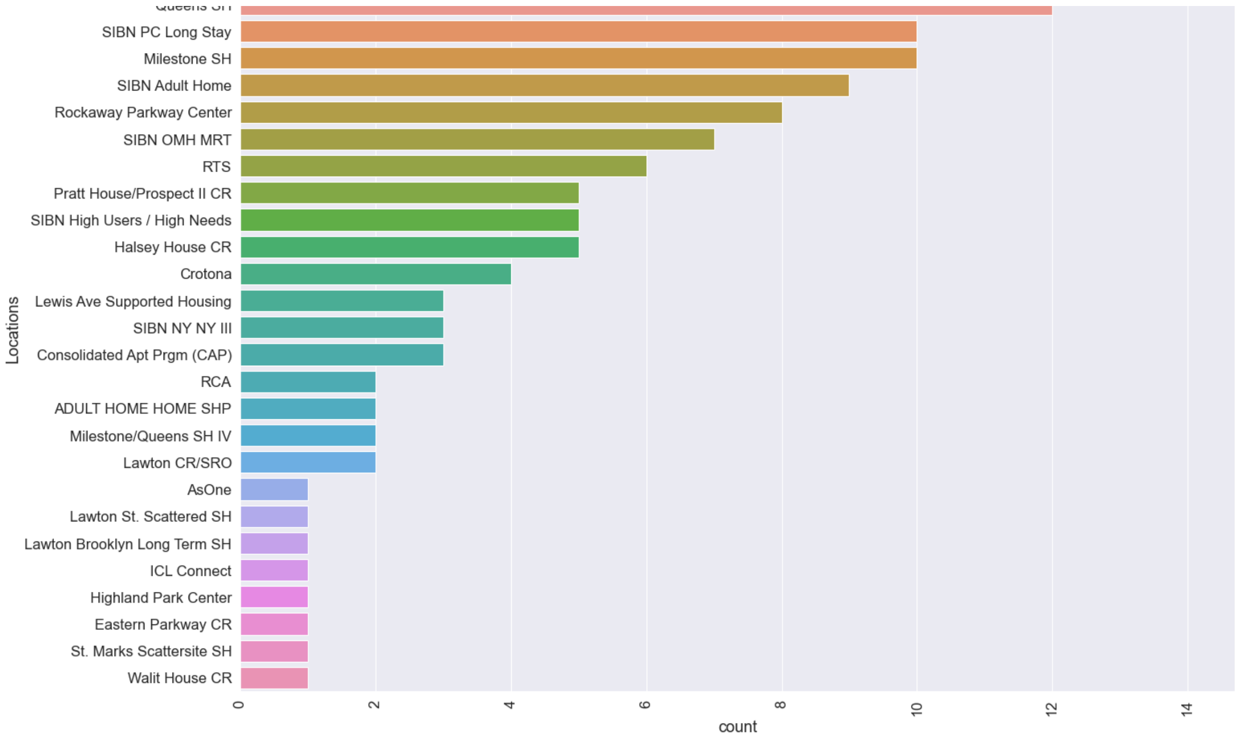
In [32]:

```
# For Stress
tmp1_LOCATIONAME = merge_stress.groupby(['LOCATIONFIXED'])['LOCATIONFI
tmp1_Type = merge_stress.groupby(['TYPEFIXED'])['TYPEFIXED'].count().s
# Plot the locationame and Type distribution using pie chart

print('128 out of 653 people have serious stress problem. And ' + str(
      '('+ str(round(len(merge_stress[merge_stress['TYPEFIXED'] == 'SH
     +str(len(merge_stress[merge_stress['LOCATIONFIXED'] == 'OARS Clin


from matplotlib import rcParams
rcParams['figure.figsize'] = 20,10
tmp1_Type['TYPEFIXED'] = tmp1_Type['TYPEFIXED'].astype(str).replace('\
ax = sns.barplot(data=tmp1_Type, x="TYPEFIXED", y="count")
plt.xlabel('Programs')
plt.title('Serious Stress Problem Distribution on Programs')
plt.show()

rcParams['figure.figsize'] = 20,15
ax = sns.barplot( y="LOCATIONFIXED", x="count",data=tmp1_LOCATIONAME,)
plt.xticks(rotation=90)
plt.ylabel('Locations')
plt.title('Serious Stress Problem Distribution on Locations')
plt.show()
```

```
128 out of 653 people have serious stress problem. And 69(54.0%) of t
hem are in SH.
However OARS - Clinic has most people who have serious stress problem
, which is 14(11.0%)
```



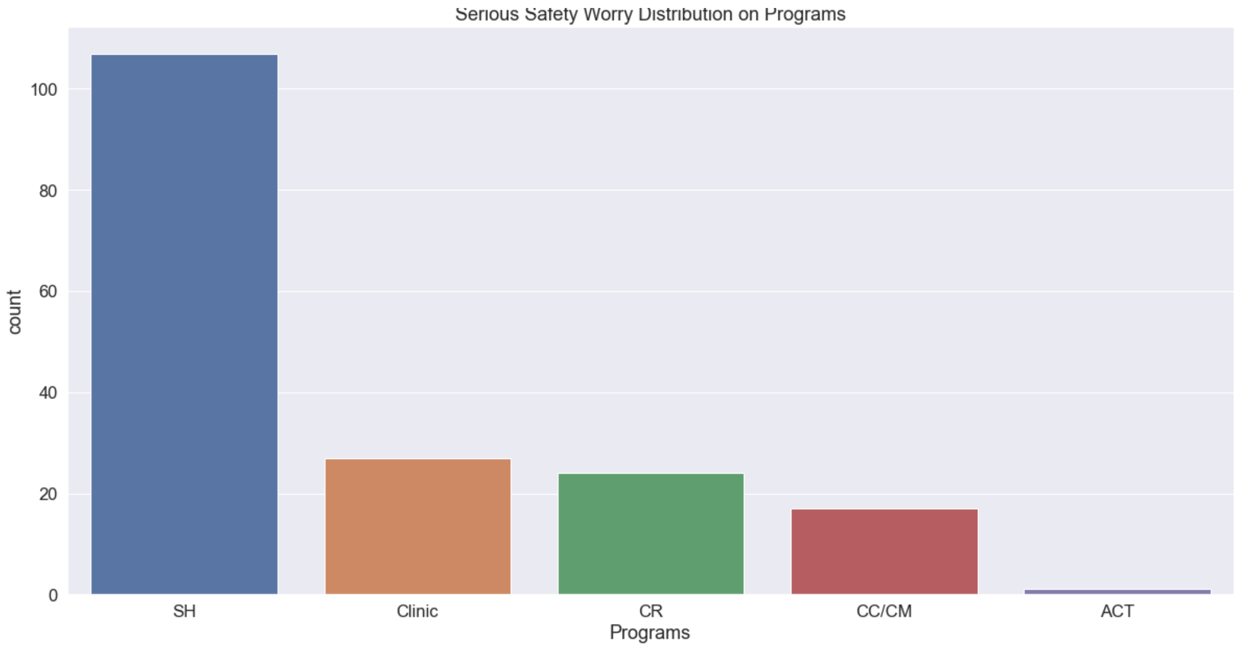


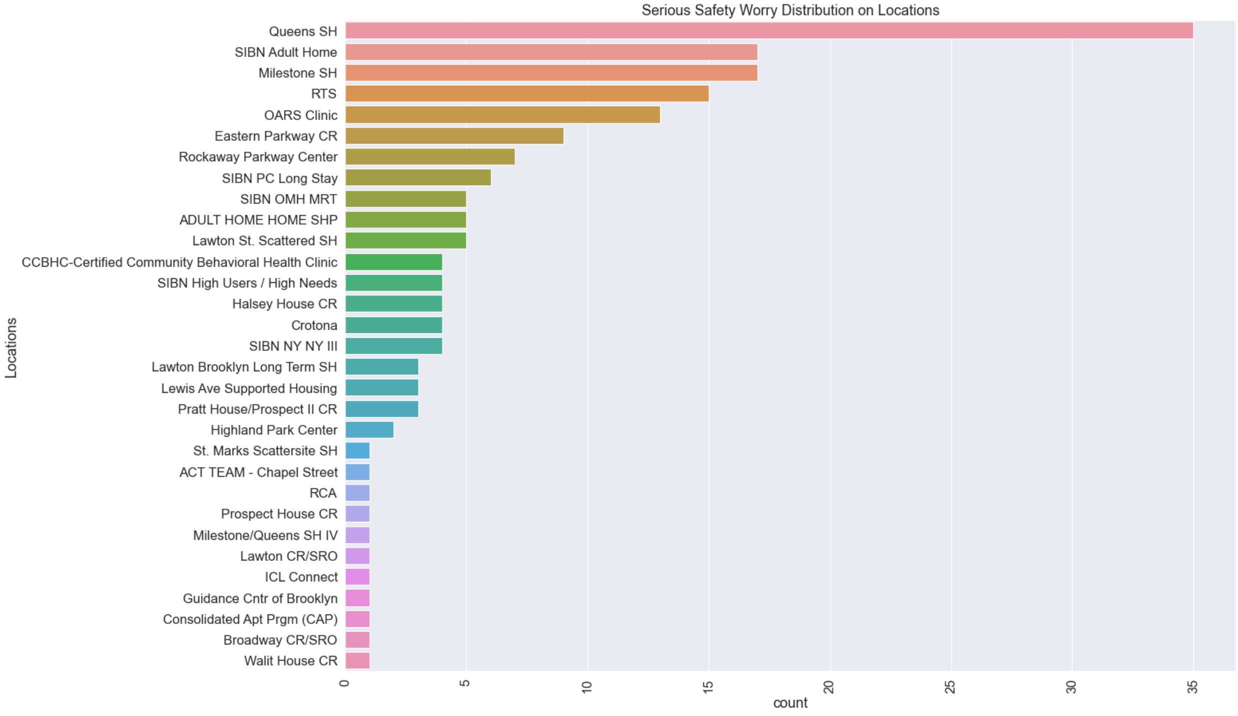


In [33]:

```
# For Safety
tmp1_LOCATIONAME = merge_safe.groupby(['LOCATIONFIXED'])['LOCATIONFIXE
tmp1_Type = merge_safe.groupby(['TYPEFIXED'])['TYPEFIXED'].count().sor
# Plot the locationame and Type distribution using pie chart

print('195 out of 653 people have serious Safety Worry. And ' + str(le
      '('+ str(round(len(merge_safe[merge_safe['TYPEFIXED'] == 'SH'])/
     +str(len(merge_safe[merge_safe['LOCATIONFIXED'] == 'Queens SH']))

from matplotlib import rcParams
rcParams['figure.figsize'] = 20,10
tmp1_Type['TYPEFIXED'] = tmp1_Type['TYPEFIXED'].astype(str).replace('\
ax = sns.barplot(data=tmp1_Type, x="TYPEFIXED", y="count")
plt.xlabel('Programs')
plt.title('Serious Safety Worry Distribution on Programs')
plt.show()

rcParams['figure.figsize'] = 20,15
ax = sns.barplot( y="LOCATIONFIXED", x="count",data=tmp1_LOCATIONAME,)
plt.xticks(rotation=90)
plt.ylabel('Locations')
plt.title('Serious Safety Worry Distribution on Locations')
plt.show()
```

```
195 out of 653 people have serious Safety Worry. And 107(55.000000000
00001%) of them are in SH.
And Queens SH has most people who have serious Safety Worry, which is
35(33.0%) among 107 people in SH
```

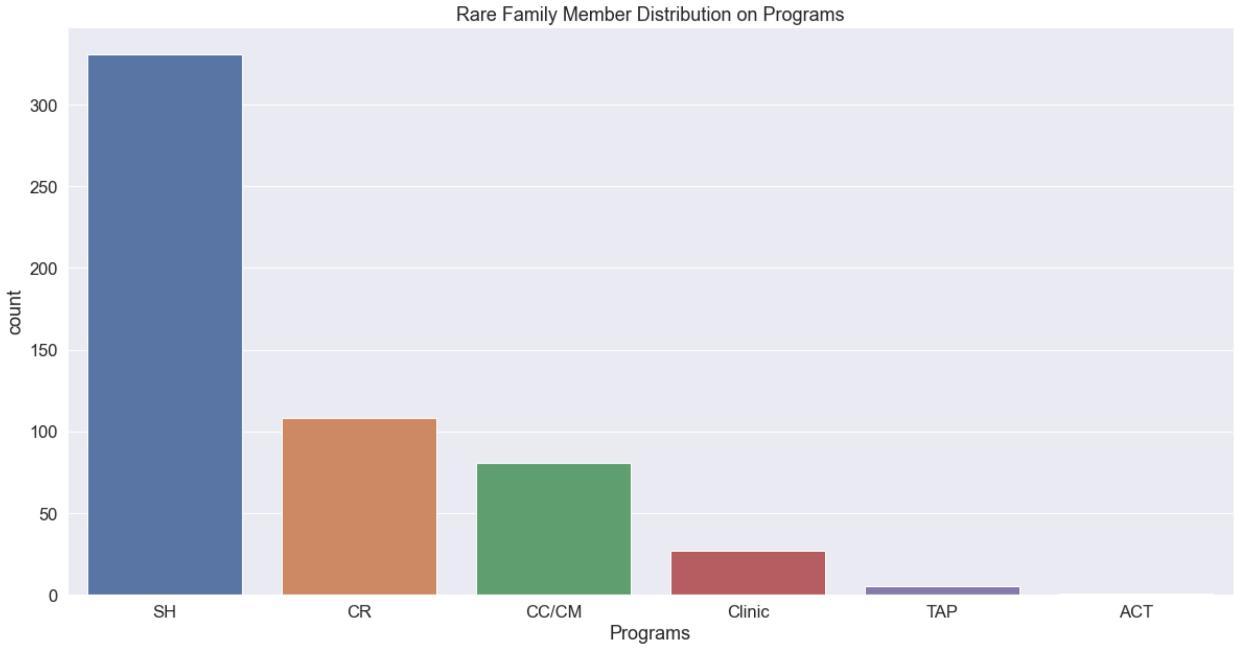

Serious Safety Worry Distribution on Programs
count
0
20
40
60
80
100
SH
Clinic
CR
CC/CM
ACT
Programs

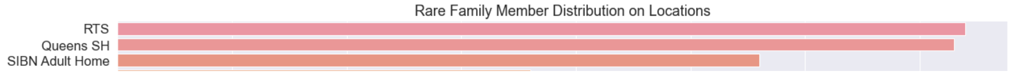

Serious Safety Worry Distribution on Locations
Locations
Queens SH
SIBN Adult Home
Milestone SH
RTS
OARS Clinic
Eastern Parkway CR
Rockaway Parkway Center
SIBN PC Long Stay
SIBN OMH MRT
ADULT HOME HOME SHP
Lawton St. Scattered SH
CCBHC-Certified Community Behavioral Health Clinic
SIBN High Users / High Needs
Halsey House CR
Crotona
SIBN NY NY III
Lawton Brooklyn Long Term SH
Lewis Ave Supported Housing
Pratt House/Prospect II CR
Highland Park Center
St. Marks Scattersite SH
ACT TEAM - Chapel Street
RCA
Prospect House CR
Milestone/Queens SH IV
Lawton CR/SRO
ICL Connect
Guidance Cntr of Brooklyn
Consolidated Apt Prgm (CAP)
Broadway CR/SRO
Walit House CR
0
5
10
15
20
25
30
35
count

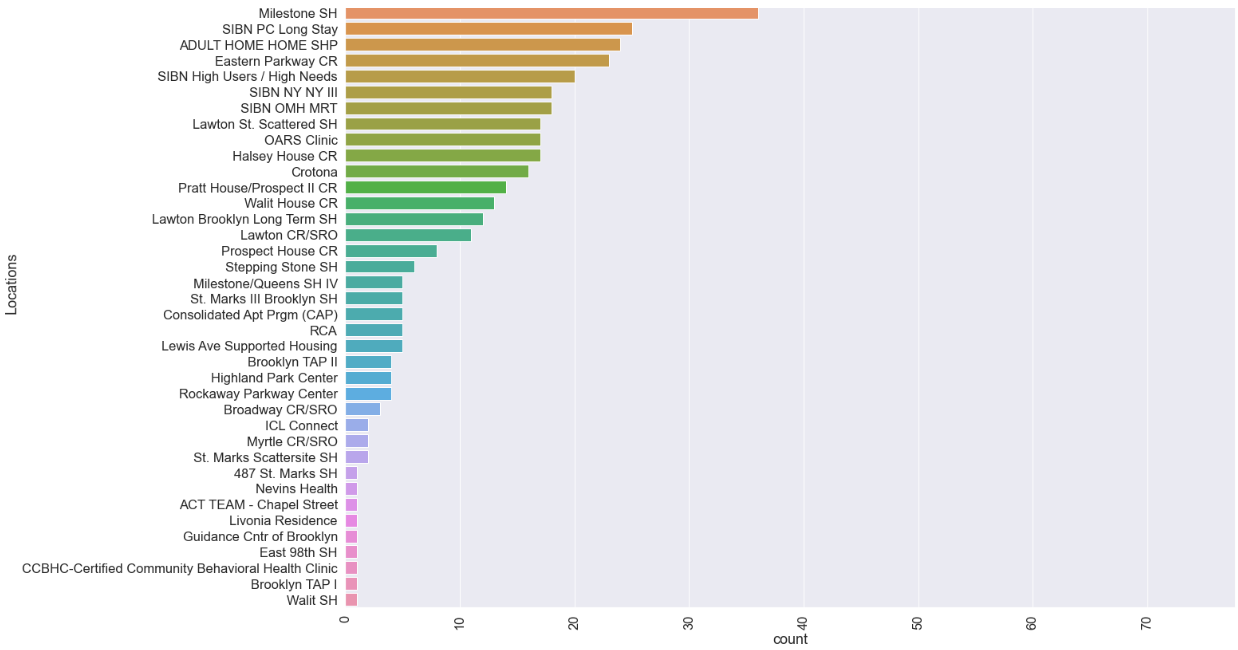
In [34]:

```
# For Family
tmp1_LOCATIONAME = merge_family.groupby(['LOCATIONFIXED'])['LOCATIONFI
tmp1_Type = merge_family.groupby(['TYPEFIXED'])['TYPEFIXED'].count().s
# Plot the locationame and Type distribution using pie chart

print('594 out of 653 people have rare family member. And ' + str(len(
      '('+ str(round(len(merge_family[merge_family['TYPEFIXED'] == 'SH
     +str(len(merge_family[merge_family['LOCATIONFIXED'] == 'RTS'])) +

from matplotlib import rcParams
rcParams['figure.figsize'] = 20,10
tmp1_Type['TYPEFIXED'] = tmp1_Type['TYPEFIXED'].astype(str).replace('\
ax = sns.barplot(data=tmp1_Type, x="TYPEFIXED", y="count")
plt.xlabel('Programs')
plt.title('Rare Family Member Distribution on Programs')
plt.show()

rcParams['figure.figsize'] = 20,15
ax = sns.barplot( y="LOCATIONFIXED", x="count",data=tmp1_LOCATIONAME,)
plt.xticks(rotation=90)
plt.ylabel('Locations')
plt.title('Rare Family Member Distribution on Locations')
plt.show()
print('Overall, Supportive Housing dominats people have serious proble
```

```
594 out of 653 people have rare family member. And 331(56.00000000000
001%) of them are in SH.
However RTS(CC/CM) has most people who have rare family member, which
is 74(12.0%)
```







Overall, Supportive Housing dominats people have serious problems, and RTS is one of the specific program locations have most people who have serious problems

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]: