Part One: Motive

Homelessness is a prevailing issue in the United States that causes severe psychological, physical, and socio-economic damage to an individual and one’s family. Several sociological studies have been carried out in the United States over the past few decades, exploring a wide range of homelessness effects, from children’s test scores to an adult’s likelihood of suffering from a substance addiction. The psychological impact of homelessness is often the most debilitating sub-product of this social issue. According to Goodman et al (1991), homelessness may lead to learned helplessness, which creates a vicious cycle where economic and psychological barriers combine to keep the individual trapped. Furthermore, learned helplessness often leads to depression, which tends to arise when the person stops believing “that their own actions can influence the course of their lives” (Goodman et al, 1991).

In addition to functionally losing one’s self support, homelessness also leads to the breakdown of support networks, both within one’s family and the community at large. Homeless individuals often suffer diminished social interaction within their previous networks, because some people see the victim as responsible for their current state and become unsympathetic (Lerner, 1970). Social disaffiliation becomes increasingly pronounced the longer an individual spends in the shelter system (Bassuk & Rosenberg, 1988). In addition to being extremely detrimental to any individual’s emotional health, a lack of social support also increases the challenge of reverting one’s homelessness situation.

The psychological impact of homelessness is even more pronounced for children. Toddlers living in the shelter system struggle to develop social skills, since their environment is physically prohibitive of free exploration and interaction with other children (Rafferty, 1991). With school-age children, the challenges lie in their educational progress. Furthermore, homeless children tend to present “poorer self-concept and more behavioral problems than housed low-income children,”
which can be explained by several of the factors that also affect their parents’ social networks and sense of self-worth (Downer, 2001).

The homelessness issue’s magnitude is considerable. According to the U.S. Department of Housing and Urban Development (HUD) 2013 Annual Homeless Assessment Report to Congress (2014), in 2013 there were over 600,000 individuals experiencing some level of homelessness in the United States on any given night. This figure, however, is considerably low due to the limited nature of the statutory definition of homelessness. In the United States includes families or an individual who lack a “fixed, regular, and adequate nighttime residence”, those who live in shelters, and those who will lose their housing imminently (Cornell University Law School). Thus, the current definition leaves out scenarios where individuals or families partner up in order to afford housing quarters, or cases when an otherwise homeless person has to live at the expense of a family member or acquaintance. Oftentimes state-sponsored programs in need cannot help individuals, since they do not fit under the formal definitions of homelessness. Even with eligibility it is often a challenge to get assistance. The U.S. Conference of Mayors found that families waited on average two years for housing assistance programs (Morse, 1992).

The good news is the homelessness issue in the United States has been in steady decline since the mid-2000s. The U.S. Department of Housing and Urban Development’s (HUD) 2013 “Annual Homeless Assessment Report” (2014) indicates a 9.2% drop since 2007 in the point-in-time estimate of homeless people in any given night. A similar trend can also be observed in Mercer County, where the yearly point-in-time snapshot of Mercer County’s homeless population has declined by 33.8% from the 2012 number, to a total of 668 homeless individuals (Rojas, 2014). The large drop from 2012 to 2013 ranks as the third largest drop in New Jersey. The map in Figure 1, from the news website NJ Spotlight (Interactive Map, 2013), highlights the changes across all counties in the state.
Programs such as the Crisis Ministry of Mercer County’s Homeless Prevention Program are responsible for the recent expressive drop in homelessness levels. This Program provides grants for at-risk individuals across three verticals: Rent/Mortgage, Securities, and Utilities. Utility grants determined by a lottery, while the others are decided through client interviews. The Program has collected data on its clients for over a decade, yet a comprehensive population study has never undertaken. As such, this project was primarily intended as a statistical analysis of the Crisis Ministry’s target population. Furthermore, by fitting predictive models to the Program’s grant expenditure’s evolution over time, it was possible to identify seasonal fluctuations in the clients’ needs and to relate the grant volume to the region’s homelessness risk. The predictive results can also be utilized in a practical manner – to assist the Crisis Ministry with their short-term budgeting questions.
Part Two: Action Items

Based on the data analysis portion of my thesis, there were five main conclusions that may lead to implementable changes within the Crisis Ministry’s Homelessness Prevention Program:

1. Tailor services to the average client profile;
2. Adapt financial and human capital allocation to seasonal fluctuations identified;
3. Plan a monthly overall grant budget according to predictive models;
4. Review grant records for October and November 2014;
5. Implement standardized best-practices on data input, so as to continuously update predictive models for future decision-making purposes.

Part Three: Rationale and Recommendations Analysis

Through a comprehensive analysis of the dataset’s demographic information, I found the average Crisis Ministry client profile. The average client is a middle-aged African American woman with a high-school degree, who lives in a household with one child and no other adults in addition to themselves. With this information, the Crisis Ministry may want to adapt their services and client interview staff. For example, female clients may feel more at ease if interviewed by other women. Furthermore, women’s health and/or single-parent counseling services can potentially be complementary services to the current homelessness prevention efforts, which would help address the issue’s psychological aspect in addition to the economic one.

A particularly interesting find concerns gender: over 66% of the Homelessness Prevention Programs’ clients were women, although only 51% of Trenton’s population is female. Does this gender discrepancy indicate more females are homeless? Or rather that women such as single mothers are more likely to feel in need of assistance? There are several possible explanations for this, which could potentially be reached through the Crisis Ministry’s existing knowledge of their
client base. Nonetheless, this gender discrepancy is further indication that it may be helpful to cater the interview process towards female clients.

Below are some graphs on the target population’s demographics. Further information is included in the full thesis.

![Schooling Breakdown](image1.png)

![Ethnicity Breakdown](image2.png)

In addition to mapping the population’s characteristics, I ran several regressions seeking to identify causal relationships between demographic characteristics and grant values allocated. The two most expressive results for the correlation analysis involve the number of children in a household, and household income. It seems like a family’s child count is positively correlated with the value of security grants. Furthermore, higher household income correlated positively with mortgage owed and value of both security and mortgage/rent grants. Families with higher incomes are more likely to owe more in mortgage payments, but at the same time are also more likely to receive higher grants from the Program. Whether or not both of these results reflect what the Crisis Ministry intended to incorporate in their decision-making is also an area worthy of analysis by the organization.
I ran several methods to identify trends in the Homelessness Prevention Program’s overall grant expenditures data. Figure 4, below, indicates the results of the decomposition by Loess assuming seasonality, which isolates seasonal, and trend components, the second and third plots respectively, as well as noise fluctuations. Focusing on the trend component, there are clear seasonal fluctuations throughout each year. The troughs seem to be clustered in the summer months, with peaks in the beginning and ending of the calendar year. The Crisis Ministry can therefore respond to these fluctuations by planning in advance when to staff more or less people, or budget for higher or lower grant expenditures in response to the peaks and troughs seasons.

![Seasonal Decomposition of Weekly Time Series](image)

**Figure 4 - Trend Decomposition Assuming Seasonality**

I compared nearly a dozen different time series models for fitting models to the overall grant expenditure data. These ranged from Exponential Smoothing to ARCH, GARCH models. The best-fitting model, reached utilizing a Holt-Winters Exponential Smoothing technique, provides 80% and 95% predictive intervals, plotted in Figure 5. Essentially, the historical data suggests the Crisis
Ministry should budget for an average daily expenditure of approximately $1,282. The average level below is $2,480, but it only considers days in which a grant was made (51.72% of days in a year). Therefore, $1,282 multiplied by the number of days in which the Homelessness Prevention Program is actively running should provide the Crisis Ministry with an estimate for their budgeting needs.

![Figure 5 - Holt-Winters Exponential Smoothing Predictive Plot](image)

Both the budgeting prediction and trend decomposition results, however, were strongly influenced by outlying grant expenditures in the months of October and November of 2014. These values, which appeared over three weeks, were significantly higher than any recorded values over the previous ten years. The data did not indicate a clear reason for these overblown numbers, especially considering that homelessness numbers in Mercer County have been dropping significantly. Therefore, I strongly recommend an internal review of the Program’s records, to better understand the reasoning behind these disproportionate grant values made, as well as to confirm the validity of this data analysis.
Finally, in order to facilitate future internal data analysis efforts, it would be critical to implement standardized best practices for data input across the Program. This could be easily accomplished in two main ways: drastically reducing the number of possible entries in a client profile, and training staff on the importance of standardized data entry. While there are currently several dozens possible entries in a profile in the Crisis Ministry’s ACT! Database, most are rarely used, and many do not serve any practical purpose if the values are not standardized for all staff. With a leaner client profile template, with standardized quantitative fields and a single location for open-ended notes on a client, client interviews would require less time, the database would be standardized, and data analyses models could be continuously updated with new data.

The complete methodology and results of this quantitative-driven thesis can be found in the full document.

**Part Four: Conclusion**

By considering the recommendations outlined earlier, the Homelessness Prevention Program can become a more efficient program, planning their financial and human capital resources around their clients’ needs. More importantly, by personalizing the program to their client base’s unique needs, the Crisis Ministry can do an even more effective job of serving their target population. For example, I believe it may be worthwhile to consider directing the program specifically towards women’s needs, or to create a parallel branch in which female clients may receive additional psychological or economic support based on their unique needs.

Another goal of the data analysis was to find a proxy indicator for homelessness risk within the Crisis Ministry’s target population. The initial assumption was that grant expenditures would move in unison with homelessness risk. Cross-analyzing Census and my own time series analyses, however, it seems as the two have an inverse relationship - homelessness numbers have dropped
considerably in Mercer County over the past year, while Homelessness Prevention Program grant expenditures have risen dramatically (NJ Counts). One possible interpretation is that as individuals move away from homelessness and into a transitory stage, they need financial assistance from programs such as the Crisis Ministry’s, as a source of support to maintain their families out of homelessness. Furthermore, it seems reasonable to expect that as the homelessness number stabilizes at even lower counts, the Crisis Ministry’s grant expenditures will follow suit. Thus, it seems that the two - grant expenditures and homelessness risk - are negatively correlated, with the grant expenditures lagging slightly behind in time to the homelessness numbers in Mercer County. If this is true, the Crisis Ministry should observe a tapering off in grant expenditures in the near future, following the 2014 decline in Mercer County homelessness.
Bibliography


