The Emergency Homeless Shelter Availability Across Toronto are Insufficient For Overwhelming Demand*

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This paper analyzes the occupancy and capacity of emergency homeless shelters across Toronto, noting the high demand across all regions throughout the months. Dividing analysis of the data into different neighbourhoods, areas in Old Toronto are identified to have higher bed occupancies and number of shelters. Similarly, problem areas in North York and Old Toronto with patterns of inability to provide the number of bed spaces promised are also identified. Combining with the context of the current literature researching homelessness, these findings indicate a high urgency for the Toronto city council to implement effective short-term and long-term support programs to target the current homelessness crisis.

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*Code and data are available at: https://github.com/cher-ning/shelter_occupancies

1 Introduction

Much like many other large cities around the world, Toronto is facing a homelessness crisis that seems to be ever-increasing. Whether it is because of societal factors such as rising housing prices and lack of employment opportunities, or personal issues such as substance abuse and mental health struggles, the homeless population of Toronto has risen to an alarming 10,811 in May 2023 (Draaisma 2023). In response, the city council has declared homelessness an emergency and pledged their full efforts towards helping the homeless population move into safe homes (Draaisma 2023). Since then, the city has focussed on securing more financial support from the provincial and federal government, requesting up to $25 million to fund various housing projects (Draaisma 2023).

In addition to these long-term projects, temporary shelters are also crucial during this transition process to provide short-term safety and resources. Research has shown that without access to shelter services, individuals can be pushed into substance-use relapses and hospitalizations, food insecurity, and institutional circuitry through criminal justice systems (Kerman et al. 2024). These shelters also provide useful data to track and understand the current progress of the city's battle against this crisis.

With that in mind, how did the city council's efforts turn out? Analyzing Toronto's shelter occupancy data from 2024, we do not see optimistic results. Average occupancy rate of emergency shelters per night remains at 99%, with no significant decrease across the months (Toronto Shelter & Support Services 2024). As well, the funding capacity of shelters was observed to decrease instead of increase, despite the high demand (Toronto Shelter & Support Services 2024).

In this paper, emergency shelter occupancy and availability will be compared across different months as well as different regions of Toronto to search for patterns. The region of each shelter will be determined by its forward sorting area (FSA) code, or the first three digits of its postal code. As well, the regions that observe the highest frequency of failing to make efficient use of funding are identified as potential problem areas; further investigation into potential causes would be beneficial to understand if there are improvements that can be made so that the limited available funding can be maximized.

To achieve this, Section 2 will introduce the Toronto Shelter & Support Services dataset used for the present analysis and the data cleaning methods applied. The following Section 3 will then go more into depth to apply context to the patterns present in the data, aiming to understand the scope and urgency of the issues at hand.

2 Data

2.1 Overview

The dataset used for analysis is of shelter occupancy in the year 2024 (Toronto Shelter & Support Services 2024), from Open Data Toronto (Gelfand 2022). The data is updated daily by the Toronto Shelter & Support Services and has the Open Data License (Section A.2). However, one limitation it faces is that it is unaudited, therefore there are limited verification methods to ensure that the shelter programs' records accurately reflect their state.

All shelters in this dataset are classified as either Emergency or Transitional programs, with Transitional locations providing more specialized programming and being exclusively offered to eligible individuals (Toronto Shelter & Support Services 2024). With consideration for the greater accessibility of Emergency programs to the entire homeless population as well as the greater number of them compared to Transitional type shelters, this analysis will focus on Emergency programs only (Toronto Shelter & Support Services 2024). As well, all recorded shelters either measure capacity based on number of beds or rooms, and this analysis will focus only on bed-based capacity shelters due to its greater prevalence (Toronto Shelter & Support Services 2024). This means that all entries pertaining to non-Toronto based, Transitional type, or room-based capacity shelters were not considered in this analysis. It should also be noted that as this dataset contains only data from this year, only data from January 1 to September 26 was accessible as of writing this paper, and therefore only these entries were utilized in analysis.

With the remaining data entries, the variables of interest were the shelter's location, funding capacity, actual capacity, occupied beds, unoccupied beds, unavailable beds, and occupancy rate. Funding capacity refers to the maximum number of beds the location is able to offer, and represents the sum of actual capacity and unavailable beds. Unavailable beds refers to the number of spaces that are out of service due to logistical reasons (Toronto Shelter & Support Services 2024). Actual capacity represents the number of beds that are usable per night, and should be the sum of occupied and unoccupied beds. After the dataset was cleaned for entries with empty values and invalid negative values, all entries in the remaining set were shown to adhere to these relations when tested.

The R Programming language (R Core Team 2023) was used for all data cleaning, testing, and analysis. The packages `opendatatoronto` (Gelfand 2022), `tidyverse` (Wickham et al. 2019), `dplyr` (Wickham et al. 2023), and `readr` (Wickham, Hester, and Bryan 2024) were used to simulate and download data. Packages `tidyverse` (Wickham et al. 2019) and `janitor` (Firke 2023) were then used to clean and test the downloaded dataset. The R code used to clean, test, and display data were adapted from Alexander (2023).

2.2 Results

This following section will use packages `ggplot2` (Wickham 2016) and `knitr` (Xie 2024) to generate several plots and tables to assist with visualizing patterns in the dataset.

Table 1 provides a summary of the shelters' mean occupancy rates over the months. As observed, there is consistently high demand for shelters regardless of the time of year.

Table 1: 2024 Shelter Occupancy Rate Over the Months

Month	Occupancy Rate
Jan	98.82
Feb	99.17
Mar	98.53
Apr	98.94
May	99.13
Jun	98.77
Jul	99.12
Aug	99.37
Sep	99.36

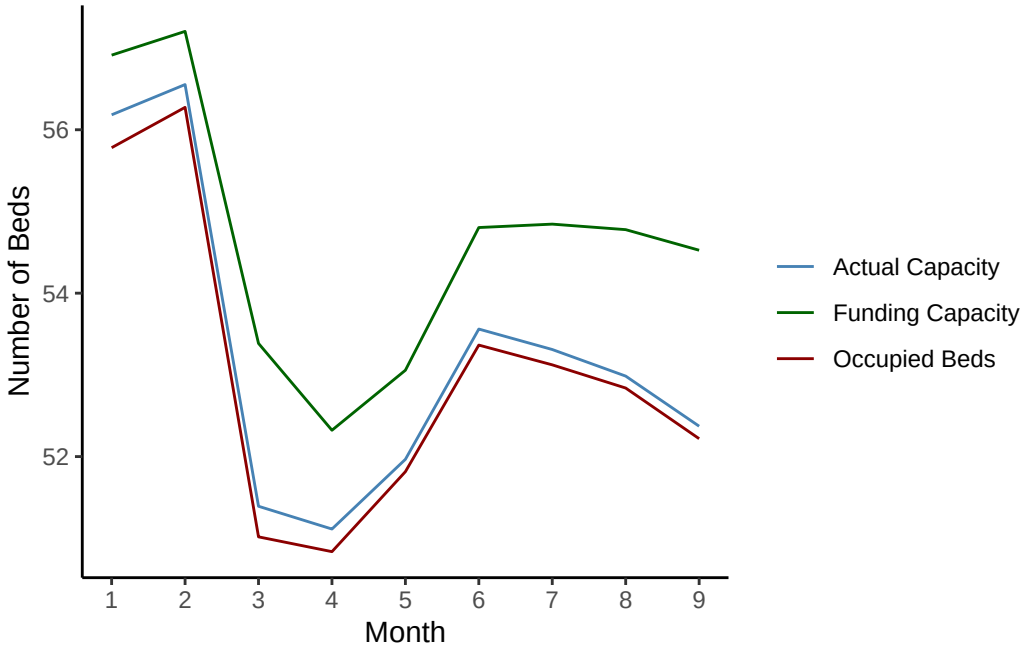

Figure 1: Shelter Capacity and Occupancy From Jan to Sep 2024

Shelter occupancy can also be viewed from the angle of mean funding capacity, actual capacity, and real number of occupied beds per month. The high occupancy rate observed in Table 1 makes it unsurprising to see the number of occupied beds consistently match so closely to the shelters' actual capacity in Figure 1. Notably, Figure 1 also shows a significant decrease in funding around March, which will be further discussed in Section 3. It is also important to note that despite the near 100% occupancy rate, there is often a gap between the funding capacity and actual capacity, suggesting that sometimes the given facilities may not be utilized at their maximum potential. This is a potential area of concern, and its implications will also be discussed in Section 3.

Another dimension to consider is the geographical region of the shelters. Still focussing on the mean number of occupied beds, Figure 2 shows a rather wide spread of values across different FSA regions, ranging from a minimum of 18.60 to a maximum of 87.74. Some of the regions reporting on the higher end include M5H, M6P, and M2H, which are neighbourhoods in Old Toronto, around High Park, and North York respectively (ZipDataMaps, n.d.).

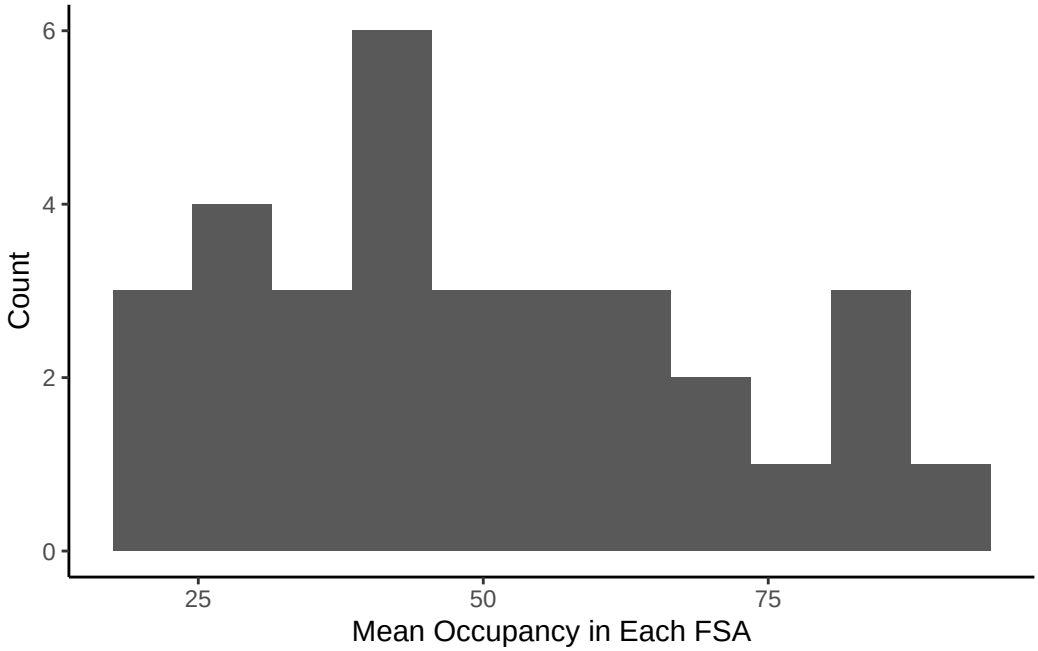

Figure 2: Average Bed Occupancy of Shelters in Each FSA Region

Table 2: Top 5 FSAs by Average Beds Occupied/Night

FSA	Mean Number of Beds Occupied
M5H	87.73507
M6P	85.94403

FSA	Mean Number of Beds Occupied
M2H	85.70896
M6K	81.26794
M5A	77.58513

Another variable to consider when searching for patterns between geographical region and rates of homelessness is the number of distinct shelter locations made available there. Sorting for unique shelter ID's across the 32 FSA regions in this data set, Table 3 and Figure 3 show that regions most commonly have only 1-2 shelters each, but there are areas with particularly high density. Specifically, the region M5A located in Old Toronto (ZipDataMaps, n.d.) has 7 shelters, which is several times the number placed in other regions.

Table 3: Top 6 FSAs by Number of Emergency Shelter Locations

FSA	Number of Shelter Locations
M5A	7
M5R	4
M5C	3
M5S	3
M6H	3
M6K	3

As shown previously in Figure 1, there is often a gap between a shelter's funding capacity and its actual capacity. This difference, reported as the number of unavailable beds in this dataset, represents resources that should have been available to the homeless population but was not on a particular night, either due to maintenance, renovations, outbreaks, or pest control issues (Toronto Shelter & Support Services 2024).

Using similar methods as above to group data by FSA code, the average number of unavailable bed spaces per region is found to be 1.30.

Despite this promisingly low number, Table 4 displays some of the FSAs with highest average unavailability per night and shows that the distribution across regions is noticeably skewed. M2N and M5G especially stand out, representing neighbourhoods in North York and Old Toronto respectively (ZipDataMaps, n.d.). The unavailability as a percentage of funding capacity was also calculated to verify whether this gap could be simply proportional to the total capacity in these regions, and results indicate that this is not the case. Even when looking at only the unavailability as a percentage, these two regions are still significantly higher than others. The implications of this finding will be discussed further in Section 3.

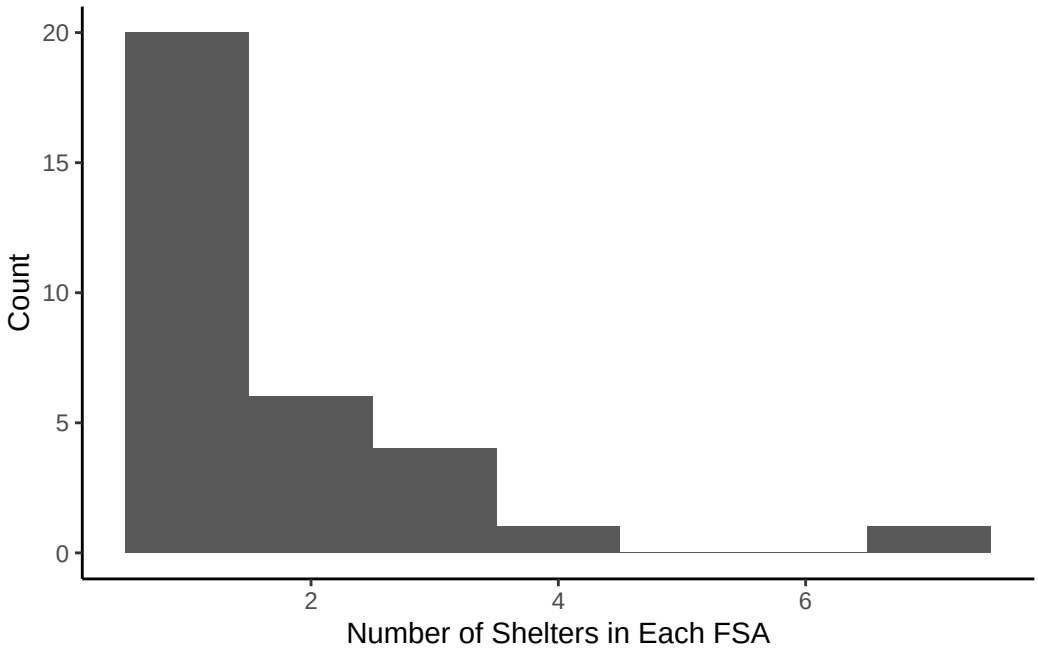

Figure 3: Number of Shelters in Each FSA

Table 4: Unavailable Beds Per Night in Different FSAs

FSA	Number of Unavailable Beds	% of Funding Capacity Unavailable
M2N	9.225	20.05
M5G	9.140	15.23
M6K	4.385	5.07
M5V	4.249	5.94
M4C	3.631	7.05
M5A	3.274	4.04
M1R	2.814	7.41
M2H	1.272	1.46
M5B	0.774	1.29
M1H	0.674	1.00

3 Discussion

3.1 Main Findings

Analysis of this dataset in Section 2.2 yielded several conclusions about the still-prevalent homelessness crisis here in Toronto. First, the consistently high occupancy rate throughout the year Table 1 suggests that the need for housing resources remains high, and is not particularly affected by time of year. However, as observed in Figure 1, there is a relatively steep dip in funding capacity around March that is not preceded by a noticeable dip in demand. This decrease is potentially due to the city emphasizing their efforts during winter months, as those are intuitively the most dangerous months for those living on the streets (Draaisma 2023). As a result, when winter ends and weather begins warming up in March, the additional funding is no longer available, causing this large and sudden decrease.

Moving onto FSA-based observations, it was found that there are several neighbourhoods including around Old Toronto and North York that have some of the highest concentration of emergency shelters and have highest funding capacities Table 3. Despite the high occupancy Figure 2 in these specific areas, it is important to remember that these findings are purely correlational and not causational. From this data alone, it is impossible to conclude whether these areas initially had greater rates of homelessness, thereby leading the government to spend more funds building shelters here, or that it is the higher concentration and availability of shelters here that will attract more homeless population to migrate here. Despite our lack of understanding of the two variable's true relationship, the correlation alone is able to indicate that emergency services are able to effectively reach the homeless population when they are placed here. When the city council is making policies and investments into emergency resources, it will be imperative to balance out their prioritization of these major areas of high demand versus areas which presently have less access, but may have comparatively lower demand.

Next, analysis of the average bed unavailability across different FSAs revealed two specific regions of concern, M2N and M5G, which report notably higher numbers of beds being out of service each night Table 4. This is an alarming observation worthy of further investigation, as it indicates some sort of ongoing issue with the shelters in these areas that fails to convert shelter funding to actual accessible resources for the vulnerable population. Unless this pattern is due to unavoidable circumstances or planned projects, such as construction for shelter expansion, the administrative policy and organizational structures here may need to be evaluated to locate potential causes.

3.2 Implications

The observations made from this dataset reveal that the city council's effort have seen limited efficacy so far. Occupancy rates at emergency shelters remains alarmingly high all across Toronto with no sign of decreasing. This indicates that the city council still needs to continue

efforts to find effective long-term solutions that can solve the homelessness crisis from the root. Research has shown that interpersonal and community resources, in addition to subsidized housing and greater income, were associated with successful transition out of homelessness (Aubry et al. 2016).

In the meantime, consistent maintenance of these emergency services is also crucial to support the current wellbeing of the homeless population. Temporary shelters, though unable to solve the core of the problem, are vital to preventing substance abuse relapses, suicidality, and further reduction of a support network and community connections (Kerman et al. 2024). In order to improve these emergency programs which are already stretching government budgets to the maximum, problem areas such as M2N and M5G must be investigated and tackled.

3.3 Limitations and Next Steps

One major limitation of the current dataset is that it only covers data from January to September 2024 as of the writing of this paper. This means that any patterns present in the winter months of November and December are not observable to the current analysis. As well, due to the dataset being unaudited, its accuracy to the true situations at these shelter locations cannot be verified.

Further research should consider focussing in on the areas of higher occupancy and higher unavailabilities to understand the factors that may be causing these patterns, allowing for policy makers to better address the exact needs of the homeless population.

A Appendix

A.1 Dataset and Graph Sketches

Sketches created when planning out the desired dataset and graphs for the current paper are included in the Github repository.

A.2 Data License Information

"Contains information licensed under the Open Government Licence – Toronto" (City of Toronto, n.d.).

A.3 Data Cleaning

Table 5 displays 5 rows of the cleaned data used for analysis in this paper. The process involved filtering for only columns with variables of interest, removing rows with negative or NA entries, and renaming the columns for clarity and concision. Additional columns for month and FSA were also created for ease of grouping during analysis. Packages `tidyverse` (Wickham et al. 2019) and `janitor` (Firke 2023) were used.

Table 5: First 5 Rows of Cleaned Data

Month	Date	FSA	Location ID	Actual Capacity	Funding Capacity	Occupied Beds	Unoccupied Beds	Unavailable Beds
1	2024-01-01	M5S	1051	8	8	8	0	0
1	2024-01-01	M6H	1029	42	42	42	0	0
1	2024-01-01	M6G	1102	30	30	30	0	0
1	2024-01-01	M5R	1541	23	23	19	4	0
1	2024-01-01	M1H	1360	101	101	101	0	0

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