

# Analysis of Daily Shelter Occupancy in Toronto\*

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This report aims to investigate the daily shelter occupancy in Toronto, focusing on trends, occupancy rates, and shelter capacity. By exploring this dataset, we aim to gain insights into the effectiveness of shelter utilization and identify any patterns or areas that might require attention.

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\*Code and data are available at:<https://github.com/Yuki010305/paper-1.git>

# 1 Introduction

Toronto, recognized as a significant urban hub, confronts the pressing issue of ensuring sufficient shelter for its homeless community. The dataset titled “Daily\_shelters.csv” presents a valuable resource for examining the patterns of shelter use and occupancy. Through meticulous analysis of this data, we can gain a comprehensive understanding of how effectively the city is meeting the need for shelter services.

By delving into the specifics of this dataset, we can uncover critical trends and patterns in shelter occupancy. (Jadidzadeh and Kneebone 2018) This includes The number of users in different shelters, the number of shelters in various regions, and the usage of shelters by different groups of people. This information is crucial for assessing the current state of shelter services in Toronto. (Ranasinghe and Valverde 2006) Furthermore, this analysis will play a pivotal role in guiding decision-makers. By determining the shelter usage in different areas, policymakers and social service providers can better allocate resources, ensuring that they are directed where they are most needed. This could involve increasing shelter capacities, providing additional services during high-demand regions, or even developing long-term strategies to reduce homelessness. Additionally, this analysis could uncover potential areas of improvement in the city’s approach to homelessness. For instance, it might reveal a need for more specialized shelters catering to specific groups such as families, youth, or those with mental health issues. This data-driven approach allows for targeted policy-making, which could lead to more effective solutions for the challenges faced by Toronto’s homeless population.

In summary, the “Daily\_shelters.csv” dataset offers a crucial lens through which we can view and evaluate Toronto’s efforts in providing shelter to its homeless citizens. (Jadidzadeh and Kneebone 2018) The insights gained from this analysis will not only highlight current trends but also inform future strategies for resource allocation and policy development, aiming to improve the living conditions of the city’s most vulnerable residents.

## 2 Data

In order to investigate the daily shelter occupancy in Toronto, with a focus on trends, occupancy rates, and shelter capacity, I utilized the dataset “Daily Shelter Occupancy” from the Toronto Open Data Portal([Gelfand 2020](#)). The data set provides a listing of all the active shelters serving the City of Toronto area. Included in the dataset is the name of the shelter, program name, sector served (i.e. men, women, youth, families) addresses, funded program capacity, and the number of people that occupied those spaces at 4:00 AM the next morning. For example, the occupancy count of January 1st would be taken on January 2nd at 4 AM. The reporting in this dataset has now been updated as a new open data set. This updated data set includes all overnight service programs administered by the Shelter, Support and Housing Administration division rather than just shelter programs. This new data set can be found [here](#). This dataset comprises 41,062 observations of shelter data. This report focus on focus on the following variables: organization name, shelter name, sector, and occupancy. By using packages “tidyverse”([Wickham et al. 2019](#)), R([R Core Team 2020](#)), “knitr”([Xie 2021](#)), “janitor”([Firke 2021](#)), “lubridate”([Grolemund and Wickham 2011](#)), “dplyr”([Wickham et al. 2021](#)), “ggplot2”([Wickham 2016](#)).

| organization_name                     | shelter_name                    | sector   | occupancy |
|---------------------------------------|---------------------------------|----------|-----------|
| COSTI Immigrant Services              | COSTI Reception Centre          | Women    | 0         |
| COSTI Immigrant Services              | COSTI Reception Centre          | Families | 545       |
| COSTI Immigrant Services              | COSTI Reception Centre          | Families | 778       |
| COSTI Immigrant Services              | COSTI Reception Centre          | Co-ed    | 16        |
| COSTI Immigrant Services              | COSTI Reception Centre          | Women    | 2         |
| Christie Refugee Welcome Centre, Inc. | Christie Refugee Welcome Centre | Families | 69        |

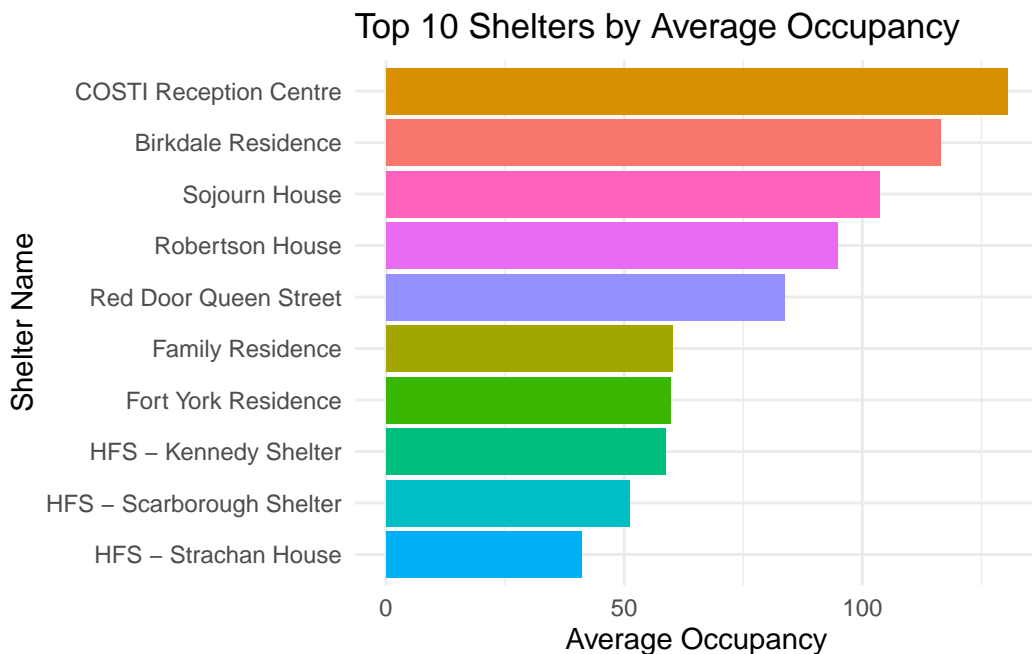
The table list occupancy data for shelters operated by “COSTI Immigrant Services” and “Christie Refugee Welcome Centre, Inc.” Here is an analysis based on the details visible: COSTI Immigrant Services: This organization operates the “COSTI Reception Centre,” which serves various sectors including Women, Families, and Co-ed. The occupancy data shows: The Women sector at one point had zero occupancy, which could indicate either the absence of demand, the availability of better-suited services elsewhere, or simply a point in time where no women were in the shelter. The Families sector had a significant number of occupants, with two different figures present (545 and 778). This suggests a variable occupancy rate over time, or that there are different categories or facilities for families within the same shelter. The Co-ed sector is shown to have a lower occupancy (16), indicating that it may be less utilized or has a smaller capacity. Christie Refugee Welcome Centre, Inc.: This center has one entry for the Families sector with an occupancy of 69. This figure indicates some level of demand for family shelter services at this facility. From this data, we can infer the following: Sector Demand: There is a notable demand in the Families sector at the COSTI Reception Centre,

which may reflect the center's capacity or a specific focus on family services. Variability in Occupancy: The presence of different occupancy numbers for the same sector at the COSTI Reception Centre suggests either fluctuations in occupancy over time or different classifications of family groups. Usage of Services: The Christie Refugee Welcome Centre serves a smaller number of families compared to the COSTI Reception Centre. This could be due to various factors such as the center's size, focus, resources, or the specific needs of the population it serves. It's important to note that to fully understand the implications of this data, additional context would be required, such as the total capacity of each sector within the shelters, the time frame for the occupancy data, and other demographic or operational details that are not provided in the table snapshot. Additionally, if the figures represent different points in time, understanding the trend over time would require a time series analysis.

## 2.1 Top 10 Shelters by Average Occupancy

### Hypothesis

I'll create a bar plot comparing the average occupancy among different shelters. This will help us understand which shelters tend to have higher occupancy rates on average. I'll focus on the top 10 shelters with the highest average occupancy. here are a few possible hypotheses that could be explored:Resource Allocation Hypothesis: The shelters with the highest average occupancy may be under-resourced relative to demand. Further investigation into funding, staffing levels, and available amenities might reveal a need for increased support at these locations. Demographic Demand Hypothesis: Shelters with higher average occupancy rates cater to a demographic with a greater need for shelter services. This could be due to factors such as family size, age demographics, or specific social services tied to the shelter. Location Convenience Hypothesis: Shelters with high average occupancy are better located, making them more accessible or desirable to potential occupants. This could relate to proximity to city centers, public transportation, job markets, or other services. These hypotheses can serve as starting points for a more detailed investigation into factors affecting shelter occupancy and could be tested with further data collection and analysis.



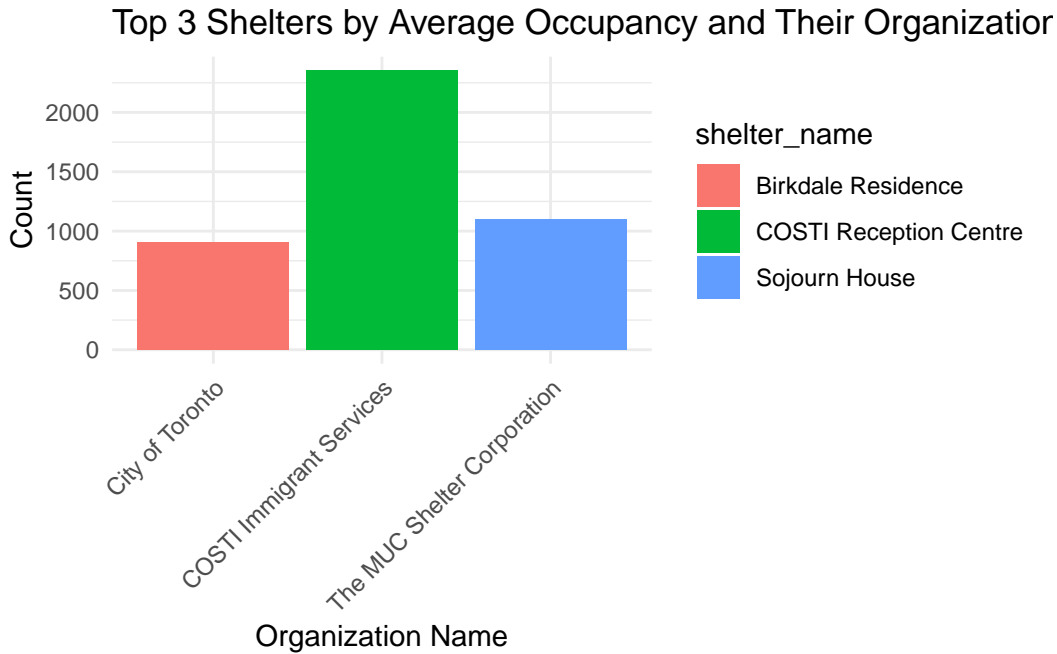
COSTI Reception Centre has the highest average occupancy among the listed shelters. This suggests that it is a highly utilized facility, which may indicate that it is a preferred option for those in need, possibly due to its location, services, or reputation. Birkdale Residence and Sojourn House follow as the second and third most occupied on average, respectively. Their significant average occupancy also points to high utilization but not as extensive as the COSTI Reception Centre. The other shelters listed, such as Robertson House, Red Door Queen Street,

Family Residence, and others, show lower average occupancy rates compared to the top three. However, they still have notable usage, indicating a sustained demand for their services.

Implications: The high average occupancy rates, especially for the COSTI Reception Centre, suggest that there is a significant demand for shelter services in its location. If the occupancy rate is often close to or at capacity, it may imply a need for more resources or the establishment of additional shelters to meet the demand without compromising service quality or safety standards. For shelters with lower average occupancy, it's important to consider whether the figures reflect adequate service provision or if there may be other factors influencing lower usage, such as accessibility, awareness of the shelter, or specific population needs that are not being fully met.

Overall, the data implies that while there is a network of shelters serving the population, the demand is not evenly distributed. Shelters with higher average occupancy might be operating under more stress and could benefit from additional support or expansion. This chart is valuable for stakeholders and policymakers as it highlights where the greatest needs for shelter services are and which facilities are most relied upon, suggesting areas where investment and resources could be prioritized.

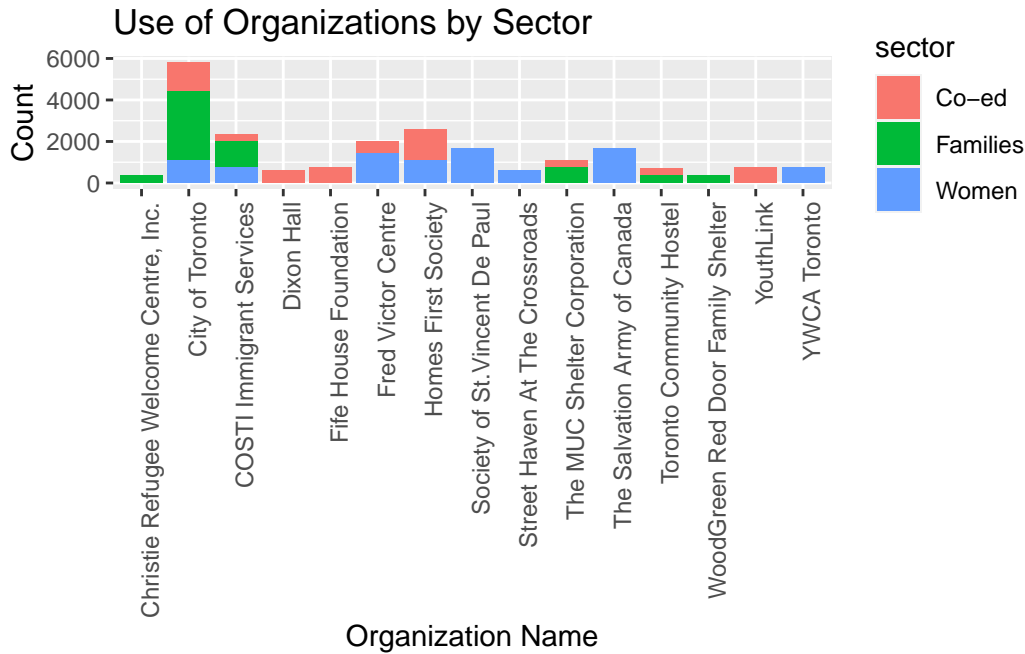
## 2.2 Histogram of Top 3 Shelters by Average Occupancy and Their Organizations



COSTI Reception Centre has the highest count, which indicates that among the top three shelters by average occupancy, it has the most usage. This could suggest that COSTI Immigrant Services is effectively meeting a significant demand, or it could be indicative of an overflow or strain on resources if the numbers exceed the intended capacity of the shelter. Birkdale Residence and Sojourn House show lower counts compared to COSTI Reception Centre, but their presence still indicates a substantial average occupancy.

Implications: The high usage count for COSTI Reception Centre suggests a strong demand for the services provided by COSTI Immigrant Services. If the occupancy often reaches or exceeds capacity, it could imply a need for expanding the shelter capacity or opening new shelters under the same organization to accommodate the demand. The organizations associated with Birkdale Residence and Sojourn House may also need to consider expanding or optimizing their services to ensure that they can adequately meet the needs of their shelter users. It's also important to consider the context behind the numbers, such as the capacity of each shelter, the specific needs of the populations they serve, and the resources available to each organization. High average occupancy can indicate effective service utilization but might also highlight a pressing need for more resources or additional shelters to prevent overcrowding and to maintain a high standard of service for all users. This chart suggests that among the top three shelters, COSTI Immigrant Services may need to assess their capacity to continue providing high-quality services given their high average occupancy and possibly explore options for expansion.

## 2.3 Use of Organizations by Sector



The provided bar chart, titled “Use of Organizations by Sector,” compares the usage counts of various organizations by three different sectors: Co-ed, Families, and Women. Here’s an analysis based on the visual information: City of Toronto: It has a significantly high count of usage in the ‘Families’ sector, dwarfing the usage counts for ‘Women’ and ‘Co-ed’. This suggests that family-oriented services are in high demand within the City of Toronto’s shelters. COSTI Immigrant Services: Shows a more balanced usage between the ‘Families’ and ‘Co-ed’ sectors, with a smaller representation of the ‘Women’ sector. This may indicate a more diverse demographic served by COSTI Immigrant Services. Women’s Sector: It is less represented overall compared to the ‘Families’ sector. However, some organizations like ‘Christie Refugee Welcome Centre, Inc.’ have a notable count for the ‘Women’ sector, which may reflect specialized services or programs for women in that organization. Co-ed Sector: Appears to have a significant presence across most organizations but does not dominate in any specific organization as the ‘Families’ sector does in the City of Toronto.

**Implications:** The dominance of the ‘Families’ sector in the City of Toronto suggests a high demand for family-specific shelters and resources. If these numbers are indicative of a persistent trend rather than a temporary surge, it would support a case for expanding family-specific accommodations and services. The relatively lower representation of the ‘Women’ sector could either indicate a lesser demand or a lack of sufficient dedicated resources for women. If the latter, this could be an area for targeted improvement. The balanced representation of sectors in organizations like COSTI Immigrant Services could be indicative of their flexible service model, which caters to a wider range of demographic groups. Co-ed shelters appear to be



consistently used but not overrepresented, suggesting that the current supply may be meeting the demand for shelters serving all genders together.

Overall, the chart suggests that while co-ed and women's sectors have consistent usage across organizations, there is a particularly high demand for services targeting families, especially within the City of Toronto. If resources are constrained, this could indicate the need for additional family-specific shelters or resources in this area to better serve the population's needs.

## 3 Discussion

This investigative report on the daily shelter occupancy in Toronto has revealed significant insights into the current state of the city’s homeless shelters, providing a clear picture of utilization trends, occupancy rates, and shelter capacity. Our analysis, grounded in data from the “Daily\_shelters.csv” dataset, underscores the critical role these shelters play in the urban fabric of Toronto, particularly in supporting some of the city’s most vulnerable populations.

### 3.1 Key Findings

**High Demand for Family-Specific Shelters:** There is a marked demand for family-oriented shelter services within the City of Toronto, as evidenced by the high usage counts in the ‘Families’ sector. This trend indicates a pressing need for expanding family-specific accommodations and services.

**Variable Shelter Utilization:** While some shelters like COSTI Reception Centre exhibit high average occupancy rates, suggesting they are key resources for those in need, other shelters demonstrate lower average occupancy. This variability points towards uneven demand distribution across the city’s shelter network.

**Need for Resource Allocation and Capacity Expansion:** Shelters with consistently high occupancy rates, especially those nearing or at full capacity, signal a need for additional resources or the creation of new facilities. This is crucial to ensure that the quality and safety of services are not compromised due to overcrowding.

**Diverse Demographic Needs:** The balanced usage of shelters among different sectors, such as ‘Co-ed’ and ‘Women’, by organizations like COSTI Immigrant Services, highlights the diverse needs of the homeless population. Some organizations, like ‘Christie Refugee Welcome Centre, Inc.’, are noteworthy for their focus on women, indicating a need for specialized services catering to specific demographic groups.

**Guidance for Policy Development:** The analysis provides valuable insights for policymakers and social service providers, enabling them to make informed decisions about resource allocation. Understanding which areas have higher shelter demands can lead to more effective and targeted approaches to addressing homelessness.

**Opportunities for Improvement:** The data-driven analysis suggests potential areas for improvement in Toronto’s approach to homelessness, such as the need for more specialized shelters for families, youth, and individuals with mental health issues.

## 3.2 Overall Implications

The comprehensive analysis of Toronto’s shelter occupancy and usage patterns reveals a complex and multifaceted picture of the city’s efforts to provide for its homeless citizens. While there are areas of high efficiency and adequacy, there are also clear indications of where additional resources, strategic planning, and targeted interventions are needed. The insights gleaned from this study should serve as a valuable tool for future policy development, aiming not only to meet the immediate needs of the homeless population but also to foster long-term strategies for reducing homelessness in Toronto.

## 3.3 Conclusion

In conclusion, the “Daily\_shelters.csv” dataset has been instrumental in highlighting both the achievements and challenges within Toronto’s shelter system. The findings from this analysis should guide the city in its ongoing commitment to improve the living conditions of its most vulnerable residents, ensuring that every individual has access to safe, adequate, and appropriate shelter services.

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