

# My title\*

My subtitle if needed

Junbo Li

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First sentence. Second sentence. Third sentence. Fourth sentence.

## 1 Introduction

You can and should cross-reference sections and sub-sections. We use R Core Team (2023) and Wickham et al. (2019a).

The remainder of this paper is structured as follows. Section 2....

## 2 Data

### 2.1 Raw data

The data used in here is downloaded from opendattoronto (Gelfand 2022). Specifically, we used the Shelter System Flow Data released by Toronto government (City of Toronto 2024). The data loading, cleaning and analysis process is done by R (R Core Team 2023), together with packages include tidyverse (Wickham et al. 2019b)... This data measures number of people requiring for shelter inside city of Toronto from Jan-2018 till Jun-2024 by each month (actively\_homeless). Also, this dataset provides division of age group, refugee status, gender, as well as chronic status to provide further detailed study into the change of composition of homeless people over time. While there are several other dataset including daily shelter occupancy in opendatatoronto, they do not have the subdivision information such as age or refugee status as this one.

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\*Code and data are available at: [LINK](#).

## 2.2 Cleaned Data

We dropped the only missing row corresponding to July-2024. We selected our columns of interest, namely, gender: ('male', 'female', 'transgender\_non\_binary\_or\_two\_spirit'), total number of homeless people every month ('actively\_homeless'), as well as refugee and chronic status in population column. In addition, we grouped age group by whether they are suitable for work (age under 24 for early career stage, age 25-44 for working age and age above 45 for pre-retirement and retirement age). Finally, we replace the month data by averaged quartered data for better analysis and visualization of a prolonged time period. The cleaned data could be seen in Table 1.

Table 1: cleaned dataset

Time (Quarters)	Subdivision	Total people	Female	Male	Other Gender	Early Career Stage	Working Age	Pre-retire and Retire
2018Q1	All Pop- ulation	8232	3001	5148	83	2413	3029	2791
2018Q1	Chronic	2562	874	1660	29	579	717	1267
2018Q1	Refugees	2575	1261	1300	14	1248	1005	322
2018Q2	All Pop- ulation	9457	3553	5809	95	2959	3557	2941
2018Q2	Chronic	2692	927	1730	35	629	767	1295

## 3 Results

### 3.1 Overall trend

First, we plot the bar graph of overall trend of homeless people over the passage of time. In Figure 1, we observe a slight increase of total number of homeless people from first quarter 2018 to second quarter of 2024. There is a decrease of homeless population in late 2020-early 2021, but increased quickly after that.

### 3.2 Gender trend

Next, we investigate the trend of gender proportion. We plot the proportion of male, female, and Other genders against time in Figure 2. Even though there are some fluctuations of the proportion of these three gender types, the overall trend is quite stable. The male proportion is around 60% while female proportion around 40% and others around 1%.

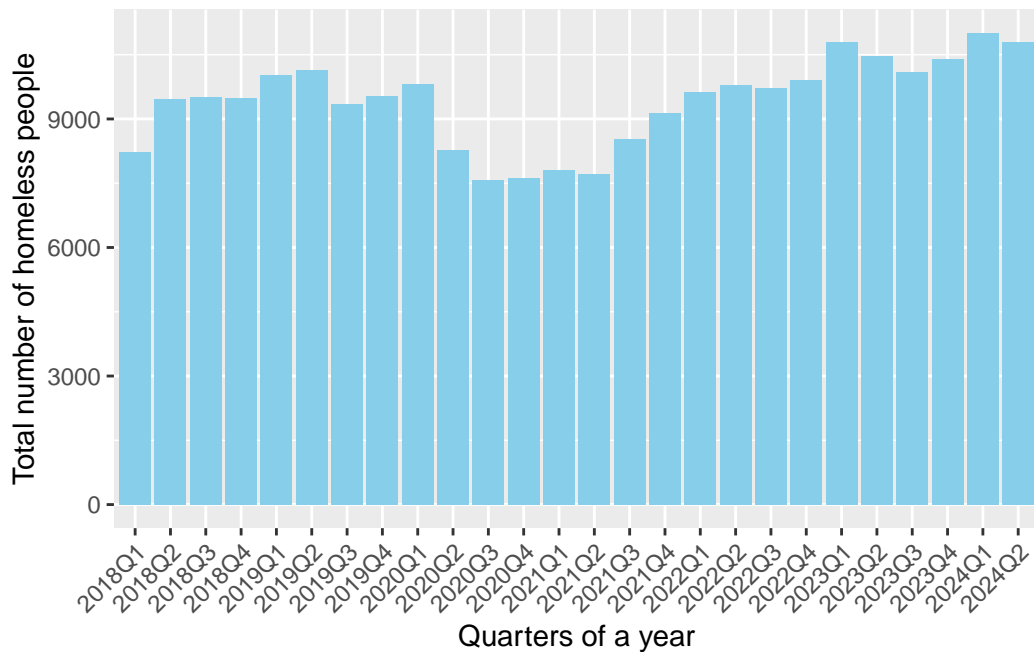


Figure 1: Homeless Population Over Quarters

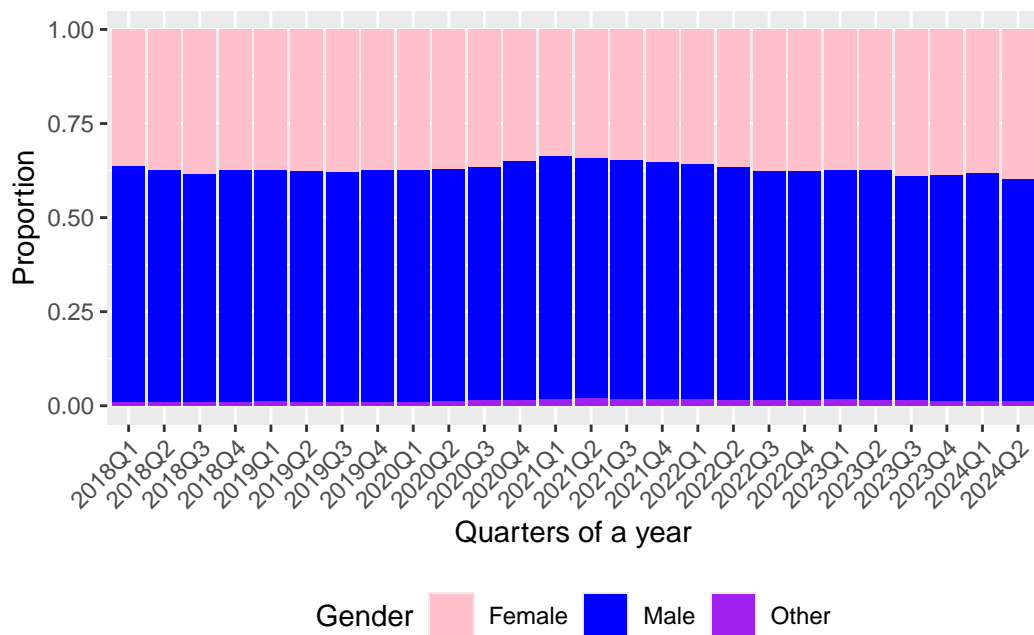


Figure 2: Proportion of Active Homeless Population by Gender Over Quarters

### 3.3 Chronic trend

Figure 3 shows the trend of the proportion of chronic population among all of homeless people over the quarters of a year. Here, according to (**chronic?**), chronic homeless refers to, “People who meet one of the two following criteria, as per the federal definition of chronic homelessness. The person has recorded a minimum of 180 overnight stay in the past year (365 days); or the person has recurrent overnight stays over the past three years with a cumulative duration of at least 546 nights.” We can see from the graph that the proportion in chronic homeless increased a lot, from less than 35% in first quarter of 2018 to more than 65% in the second quarter of 2024.

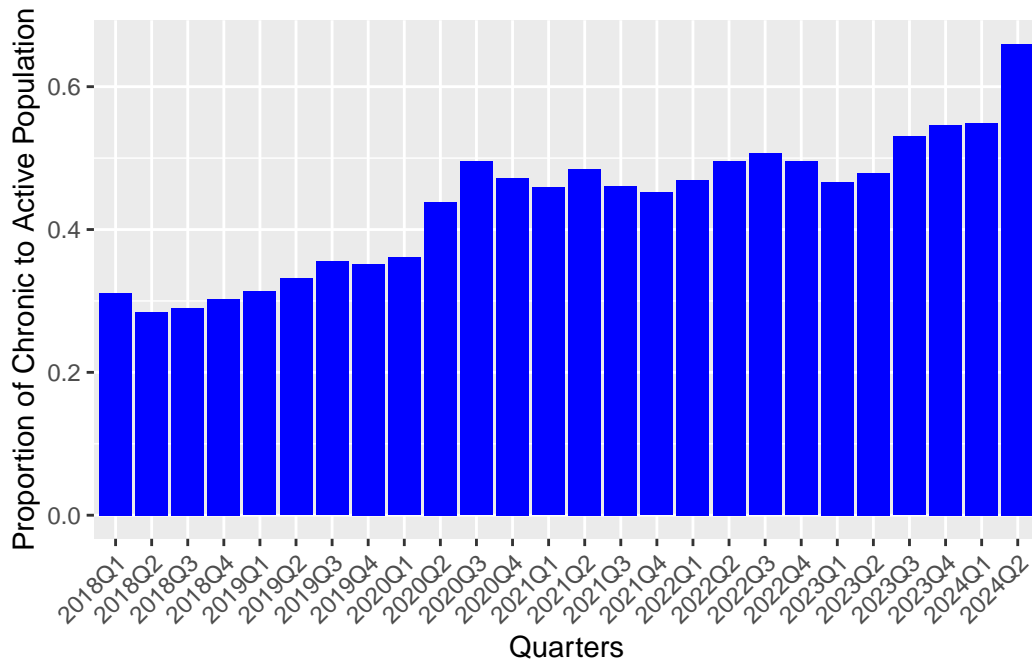


Figure 3: Proportion of Chronic population to Active Population by Quarter

### 3.4 Age trend

Figure 4 shows the trend of the proportion of different working age statuses among the actively homeless population over the quarters of a year. Here, the working age statuses are categorized into three groups: Early Career Stage, Working Age, and Pre-Retirement and Retirement Age. Even though the trend is not huge, we can see from the graph that the proportion of the Early Career Stage population as well as pre-retire and retire have decreased (from 29% and 33% separately in first quarter of 2018 to 25% and 28% in second quarter in 2024). On the other hand, working age proportion increased to 47% in 2024Q2 from 37% in 2018Q1.

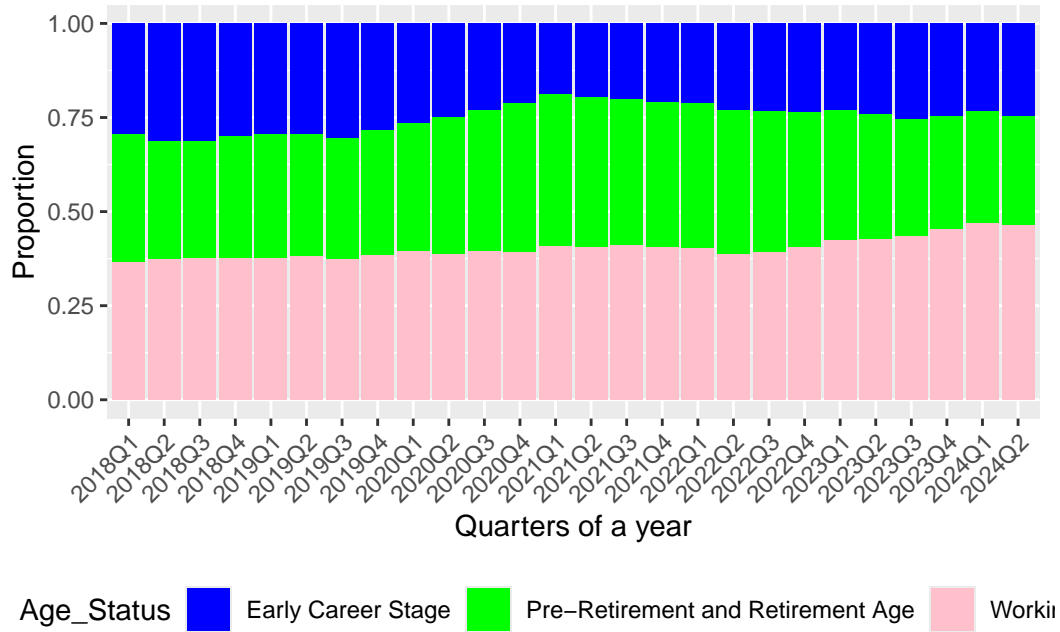


Figure 4: Proportion of working age population to Active Population by Quarter

### 3.5 Refugee trend

Figure 5 shows the trend of the proportion of refugees among the actively homeless population over the quarters of a year. We observe a significant decrease of the trend accompanied by even more significant increase.

## 4 Discussion

Based on the analysis of results section, we observe that, even though the overall population of homeless people did not incur significant variation in the past six years, its demographics changed a lot. Especially, the proportion of refugees, chronic people as well as working aged people. In the past, City of Toronto has devolved its effort on reducing the number of homeless people, especially through projects of building affordable houses (**torontosol?**). However, our study show that with the change of demographic, the city government should also give its focus on other strategies of reducing homelessness.

First, as the result section points out, the proportion of chronic homeless people nearly doubled in the past six years. Despite its nature of long lasting homeless status, studies have also shown that chronic homelessness is closely associated with chronic illness or mental problems (**chronic?**). As point by another study, average income of people experiencing mental illness

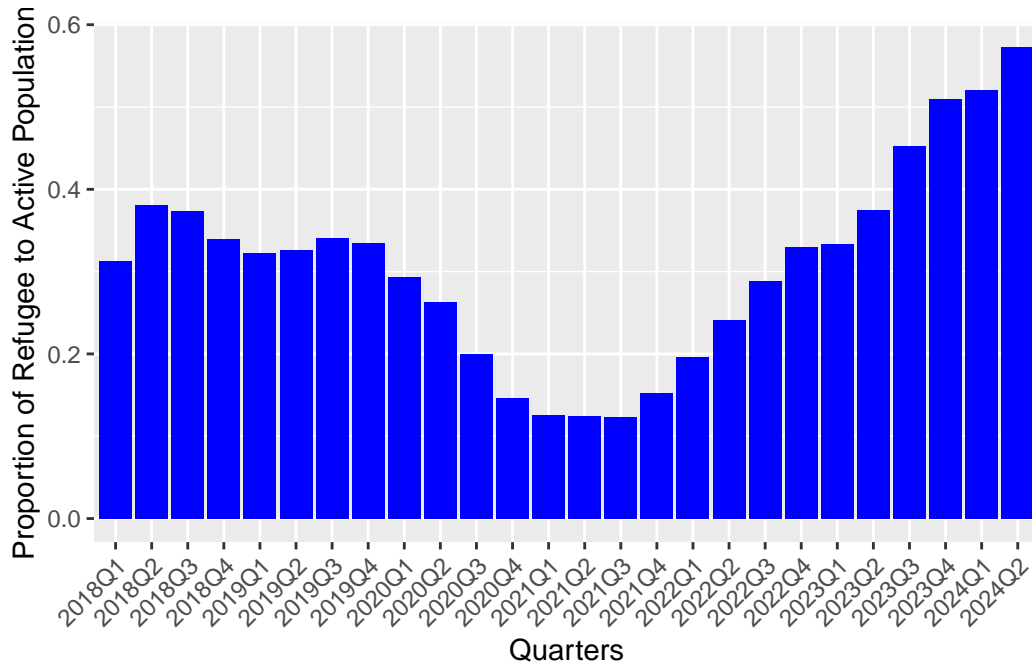


Figure 5: Proportion of Chronic population to Active Population by Quarter

and other types of disorders is significantly lower than normal people (**Sareen2011?**). Thus, it is very hard for those people who have already experiencing mental and physical illness to escape homeless. In addition, homeless people would face more severe health problem due to lack of adequate food, discrimination, barriers to health care etc (**Sleet2021?**). A combination of these would become an obvious negative cycle: illness lead to decrease of income, which leads to become homeless, which would further depend illness. What the city government can do, on the other hand, is to increase public health care system, espically focused to those low-income and homeless people. In fact, merely building houses only increased the proportion of chronic homeless people besides its aim is to reduce (**house\_\_not?**).

#### 4.1 First discussion point

If my paper were 10 pages, then should be be at least 2.5 pages. The discussion is a chance to show off what you know and what you learnt from all this.

## **4.2 Second discussion point**

## **4.3 Third discussion point**

## **4.4 Weaknesses and next steps**

Weaknesses and next steps should also be included.

## References

- City of Toronto. 2024. “Shelter System Flow Data.” <https://www.toronto.ca/city-government/data-research-maps/research-reports/housing-and-homelessness-research-and-reports/shelter-system-flow-data/>.
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- Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy D’Agostino McGowan, Romain François, Garrett Golemund, et al. 2019b. “Welcome to the tidyverse.” *Journal of Open Source Software* 4 (43): 1686. <https://doi.org/10.21105/joss.01686>.
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