Analysis on Trend of Death of Shelter Residence in Toronto*

focus on gender distribution from 2007 to 2024

Xinqi Yue

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Trough the analysis on the data about deaths of shelter residents, we found that the total number of deaths of shelter residences is increasing year by year. The proportion of male deaths is relatively higher. The study will help understanding the dynamic of mortality and making better policy and intervine to avoid similar problems in the future.

1 Introduction

The rising number of deaths within Toronto's shelter system is a growing area of concern, reflecting broader societal challenges such as homelessness, mental health crises, and inadequate access to health care. Understanding the dynamics of these deaths is critical to developing effective policies and interventions aimed at reducing mortality in this vulnerable population. This paper focuses on analyzing the dataset related to deaths in Toronto's shelter residence, and seeks to identify the demographic trends and factors contributing to these unfortunate outcomes.

Despite the importance of this issue, there is a clear gap in the public's detailed understanding of who is being affected and how patterns of mortality are evolving over time. Due to privacy concerns, the dataset is limited in scope and lacks identifying information such as names, dates of birth, and specific causes of death. Also, the Non-binary genders are not included until 2020. Nevertheless, these aggregate data allow for an examination of key trends, such as the gender distribution of deaths and the change over time. These trends highlight critical disparities, particularly the higher proportion of male deaths and the steady increase in overall mortality number.

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*Code and data are available at: https://github.com/xinqiyue/ShelterDeath.

This study aims to provide a visual and statistical analysis of the available data and to draw attention to the factors that may be contributing to the increased mortality. The analysis reveals two important findings: first, the number of deaths has steadily increased over the years, indicating a deteriorating situation within the shelter system; Second, men make up a larger proportion of the deceased, suggesting potential gender-specific vulnerabilities.

These findings are important because they provide a clearer picture of the extent and nature of mortality in Toronto's shelter population, which can be used to inform future policy decisions and the allocation of resources. By identifying key trends and limitations within the dataset, this study provides a basis for more targeted and informed interventions to address the underlying causes of death in this population. The structure of this paper begins with a detailed description of the data@sec-data, followed by the statistic model@sec-data, results@sec-data, and discussion of implications@sec-data.

2 Data

The dataset used for this analysis relates to deaths within Toronto's shelter system. It contains key demographic variables and aggregates information about the number of deaths reported each year, categorized by gender. However, due to privacy concerns and respect for the confidentiality of individuals who have passed, the dataset excludes personal identifying information including names, birthdates, or specific locations of death. This limitation necessitated the use of data for analysis focusing on factors including gender distribution and time rather than locations and age.

##Variables The dataset include the following variables:

Year: The year in which the death occurred at a Toronto shelter, ranging from 2007 to 2024. This variable aids in analyzing trends over time. Month: The month in which the death occurred, corresponding to each year from January to December. Data beyond August 2024 has not yet been recorded. Total Deaths: The total number of deaths recorded in the given month. Male Deaths: The total number of male shelter residents who died in the given month. Female Deaths: The total number of female shelter residents who died in the given month. Other Deaths: The number of deaths of individuals identified as Transgender, Non-binary, or Two-Spirit in the given month. Note that data for this category was not recorded prior to 2020.

Some of our data is of penguins (**?@fig-bills**), from

Talk more about it.

And also planes (**?@fig-planes**). (You can change the height and width, but don't worry about doing that until you have finished every other aspect of the paper - Quarto will try to make it look nice and the defaults usually work well once you have enough text.)

Talk way more about it.
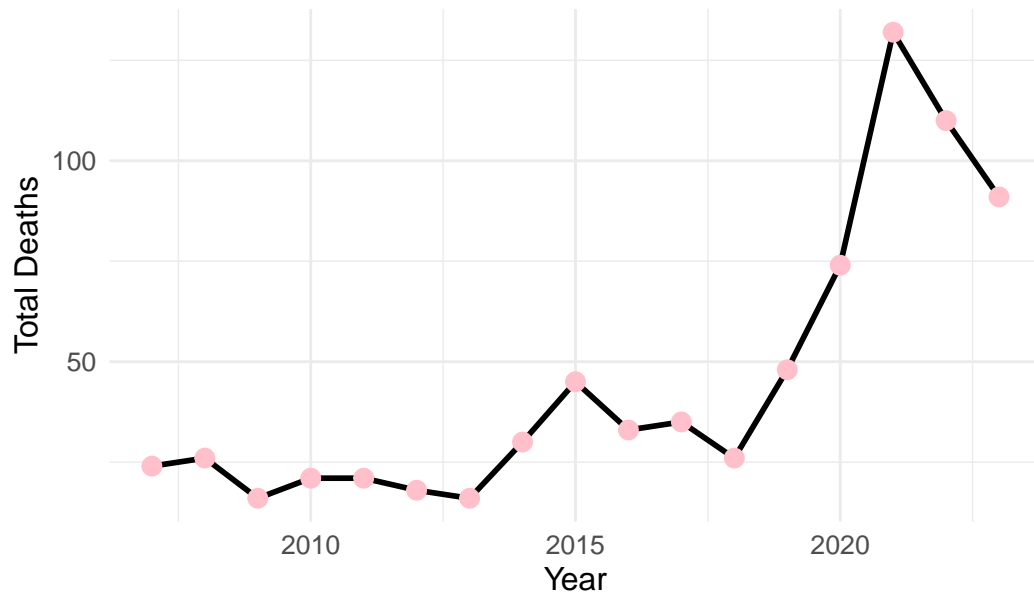
Total Deaths in Toronto Shelters (2007–2023)

Figure 1: ?(caption)

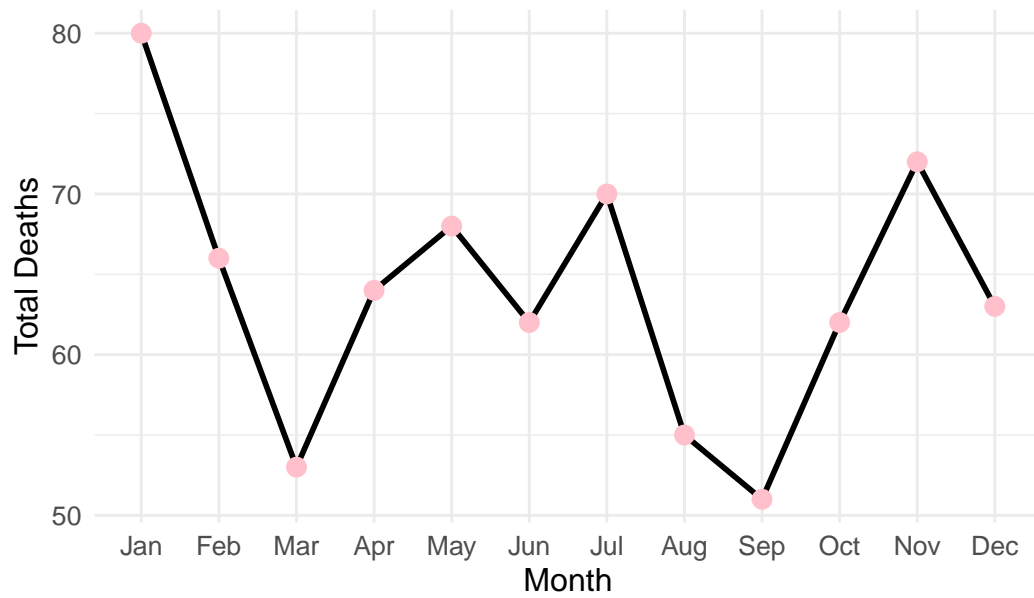**Total Deaths in Toronto Shelters (2007–2023)**

Figure 2: ?(caption)

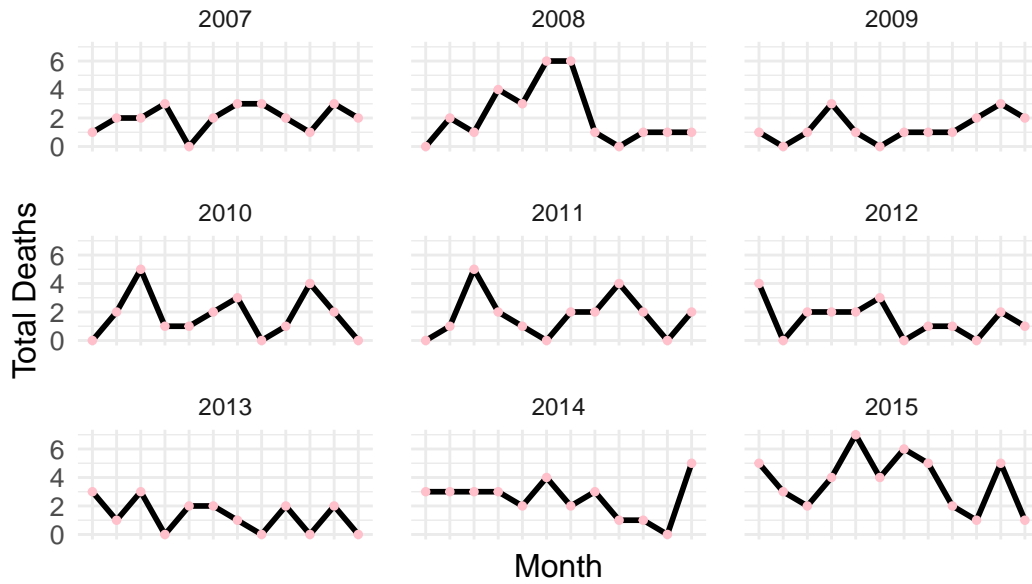## Total Deaths in Toronto Shelters (2007–2015)

Figure 3: ?(caption)

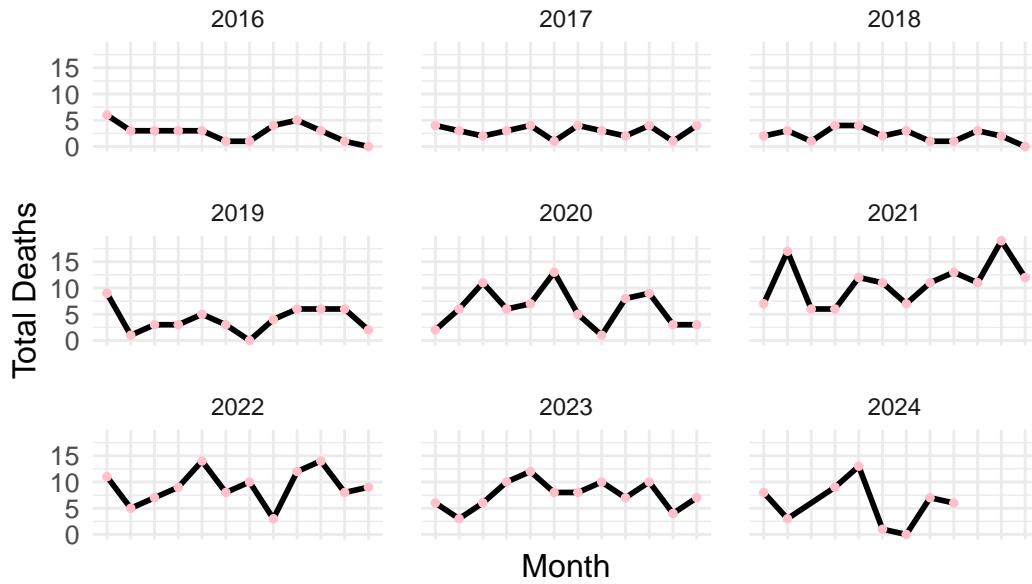## Total Deaths in Toronto Shelters (2015–2024)

Figure 4: ?(caption)

3 Model

The goal of our modelling strategy is twofold. Firstly,...

Here we briefly describe the Bayesian analysis model used to investigate... Background details and diagnostics are included in Appendix B.

3.1 Model set-up

Define y_i as the number of seconds that the plane remained aloft. Then β_i is the wing width and γ_i is the wing length, both measured in millimeters.

$$y_i|\mu_i, \sigma \sim \text{Normal}(\mu_i, \sigma) \tag{1}$$
$$\mu_i = \alpha + \beta_i + \gamma_i \tag{2}$$
$$\alpha \sim \text{Normal}(0, 2.5) \tag{3}$$
$$\beta \sim \text{Normal}(0, 2.5) \tag{4}$$
$$\gamma \sim \text{Normal}(0, 2.5) \tag{5}$$
$$\sigma \sim \text{Exponential}(1) \tag{6}$$

We run the model in R (R Core Team 2023) using the `rstanarm` package of . We use the default priors from `rstanarm`.

3.1.1 Model justification

We expect a positive relationship between the size of the wings and time spent aloft. In particular...

We can use maths by including latex between dollar signs, for instance θ.

4 Results

Our results are summarized in **?@tbl-modelresults**.

5 Discussion

5.1 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.

5.2 Second discussion point

5.3 Third discussion point

5.4 Weaknesses and next steps

Weaknesses and next steps should also be included.

Appendix

A Additional data details

B Model details

B.1 Posterior predictive check

In **?@fig-ppcheckandposteriorvsprior-1** we implement a posterior predictive check. This shows...

In **?@fig-ppcheckandposteriorvsprior-2** we compare the posterior with the prior. This shows...

Examining how the model fits, and is affected
by, the data

Figure 5: **?(caption)**

B.2 Diagnostics

?@fig-stanareyouokay-1 is a trace plot. It shows... This suggests...

?@fig-stanareyouokay-2 is a Rhat plot. It shows... This suggests...

Checking the convergence of the MCMC
algorithm

Figure 6: **?(caption)**

References

R Core Team. 2023. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.