Drug toxicity is the leading cause of deaths in people experiencing homelessness: Highest number of deaths due to drug toxicity occurring in men between the ages of 41 and 60 in 2021*

Tam Ly

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The number of deaths in people experiencing homelessness have been increasing since the COVID-19 pandemic. Using data obtained between 2017 and 2023 from the City of Toronto's Open Data Portal, we investigated the cause of deaths in people experiencing homelessness by age and gender. We found that drug toxicity is the leading cause of death, and among these deaths, men between the ages of 41 to 60 experienced the highest numbers in 2021. Our discovery reveals the hidden impacts of the pandemic on people experiencing homelessness who use drugs and highlights the need for improved services.

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*Code and data are available at: https://github.com/atn-ly/toronto_homeless_deaths_by_cause

1 Introduction

When the world was hit by the COVID-19 pandemic, everyone was told to stay at home. But where do you go if you are experiencing homelessness? In 2021, the total number of people experiencing homelessness in Toronto was 7,347 (Canadian Observatory on Homelessness 2021). People experiencing homelessness are often a last priority and it was no different during the pandemic. At the start of 2020, Toronto Public Health stopped tracking deaths of people experiencing homelessness and posting overnight shelter statistics due to overwhelming numbers (Crowe 2020). The situation was particularly devastating for people experiencing homelessness who use drugs. With pandemic restrictions, people were isolated and more likely to relapse and overdose (Centre for Addiction and Mental Health 2021).

While the leading cause of deaths in people experiencing homelessness has been reported to be due to drug toxicity (Lavoie 2023), we still do not know which age group and gender is most impacted. In this paper, we attempt to answer this question. We use R (R Core Team 2022) to analyze a dataset from City of Toronto's Open Data Portal (Toronto Public Health 2023) on the cause of deaths in people experiencing homelessness by age and gender. We construct a table and bar chart to describe how many deaths occurred each year between 2017 and 2023 and the cause of death. After determining that drug toxicity is the leading cause of death, we construct another bar chart to describe how many deaths due to drug toxicity occurred each year between 2017 and 2023 by age and gender. We found that men between the ages of 41 to 60 experienced the highest numbers of deaths due to drug toxicity in 2021.

Data on deaths of people experiencing homelessness has been historically underreported, and it is crucial to collect and analyze this data to identify the groups that need support, as they are not just numbers but actual human beings. The remainder of the paper is contained in Section 2 which includes two parts: Section 2.1 discusses the source of the data and how it was collected and Section 2.2 presents the analysis of it using tables and figures to tell the story about people experiencing homelessness in Toronto.

2 Data

2.1 Data source and collection

The dataset being used in this paper was taken from the City of Toronto's Open Data Portal (Toronto Public Health 2023) using the package `opendatatoronto` (Gelfand 2022). The data is measuring "people experiencing homelessness who die while living on the street, at a friend's place, at a shelter, or at other locations in Toronto," where homelessness is defined as, "the situation of an individual or family without stable, permanent, appropriate housing, or the immediate prospect, means and ability of acquiring it" (City of Toronto 2024). The dataset is refreshed semi-annually with the last update being on September 29, 2023. Toronto Public Health (TPH) began measuring this data on January 1, 2017 from reports submitted by three primary sources: agencies that support people experiencing homelessness, the Shelter, Support, and Housing Administration (SSHA), and the Toronto Homeless Memorial (City of Toronto 2024). The reports are then analyzed to rule out duplications.

The average age at death for people experiencing homelessness is 38 years old, compared to the average Toronto's citizen's 81 years of life expectancy (Hayes 2022). Often referred to as the "invisible population," the deaths of people experiencing homelessness were unaccounted for until the Toronto Star published a three year investigation in 2016 (Ormsby and Wallace 2016). Without proper reporting, this downplays the issue of homelessness and prevents the government from making informed policies and spending decisions. This data was collected as an initiative to improve the health of people experiencing homelessness. Despite all this, there are only two places in Canada collecting this type of data as of today: Toronto and Vancouver (Hayes 2022). Nonetheless, the story is the same: Every. Person. Counts.

2.2 Data analysis

We analyzed the data in R (R Core Team 2022) using the packages `janitor` (Firke 2023), `knitr` (Xie 2023), `opendatatoronto` (Gelfand 2022), and `Tidyverse` (Wickham et al. 2019). There were two other datasets that were available to download from the Portal: "Homeless deaths by month" and "Homeless deaths by demographics," but were not used because they did not include the cause of death.

The variables included in our dataset were mainly categorical—*ID number*, *Year of death*, *Cause of death*, *Age group*, *Gender*— and one numerical: *Count*. The *ID number* was part of the dataset to protect the privacy of the deceased, but this was not needed in our analysis because we are not interested in keeping track of the ID of each individual. The *Year of death* variable had values ranging between 2017 and 2023. For each year, there were up to 10 different causes of death: by accident, cancer, cardiovascular disease, COVID-19, drug toxicity, homicide, other, pneumonia, suicide, and unknown/pending. Then each cause was broken down by the total number of deaths for each age group (<20, 20–39, 40–59, 60+, and unknown) and gender (male, female, and unknown). Observations with a count of zero were not recorded in the dataset. (Table 1) shows a sample of the cleaned dataset with the variables used in the analysis along with the first 15 out of 253 observations. No other variables were constructed or combined.

Table 1: Sample of cleaned dataset for the number of deaths for each cause of death, age group, and gender between 2017 and 2023

Year	Cause of death	Age group	Gender	Count
2017	Accident	40-59	Male	2
2017	Accident	60+	Male	3
2017	Cancer	60+	Female	1
2017	Cancer	40-59	Female	2
2017	Cancer	40-59	Male	2
2017	Cancer	60+	Male	4
2017	Cardiovascular Disease	60+	Female	2
2017	Cardiovascular Disease	Unknown	Male	1
2017	Cardiovascular Disease	20-39	Male	2
2017	Cardiovascular Disease	40-59	Male	4
2017	Cardiovascular Disease	60+	Male	5
2017	Drug Toxicity	40-59	Female	2
2017	Drug Toxicity	20-39	Female	3
2017	Drug Toxicity	Unknown	Male	1
2017	Drug Toxicity	60+	Male	3

Some notes on the measurements of the *Year of death*, *Gender*, and *Count* variables are required. Since the dataset was last updated on September 29, 2023, we did not include the number of deaths for the months of October, November, and December of 2023 because there was no data available. Moreover, the cause of death for other genders was not collected by TPH due to small counts, so we could not include them in our analysis. In "Counting the Countless," this can be a result of "administrative violence" (Keyes 2019). Lastly, due to the government shutting down the tracking of deaths of people experiencing homelessness in 2020, the count for this year may be particularly underreported. It is not known how many other deaths are missing, but we attempt to visualize the data that is available.

We are interested in finding the leading cause of death over the years. In (Figure 1), a bar chart summarizes the data and shows the relationship between the number of deaths, year, and cause of death. We see that drug toxicity was the cause of most deaths for each year with a large increase starting in 2020 which coincides with the start of the COVID-19 pandemic. For people experiencing homelessness, the pandemic aggravated an already stressful situation and many people reported increased substance use and fear of relapse and overdosing (Centre for Addiction and Mental Health 2021). People were also administering drugs alone due to pandemic restrictions, which means decreased access to harm reduction programs and emergency services (Centre for Addiction and Mental Health 2021). In 2023, the numbers of deaths returned to pre-pandemic levels, but as noted before, the data for the months of October to December are not included here.

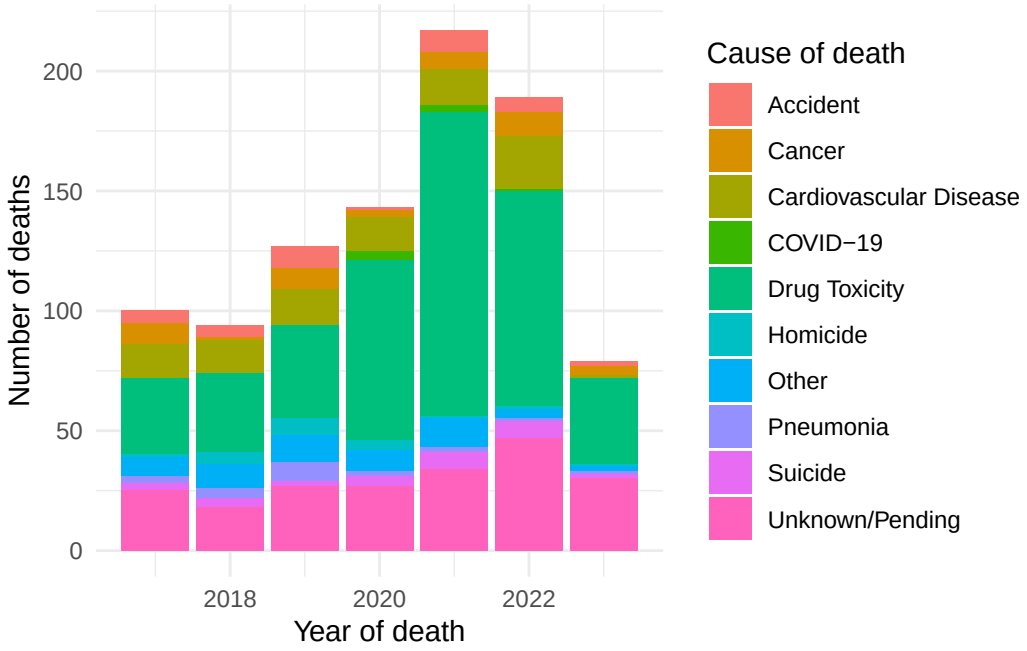

Figure 1: Relationship between the number of deaths, year, and cause of death

Now that we know the leading cause of deaths over the years is due to drug toxicity, we are interested in finding which age group and gender is most impacted. In (Figure 2), another bar chart shows the relationship between the number of deaths due to drug toxicity, year, age group, and gender. This was done by filtering for only the rows containing the number of deaths due to drug toxicity. We see a similar pattern as in (Figure 1), and we also see that in 2021, males aged 40–59 had the highest number of deaths, followed closely by males aged 20–39. Females across all age groups experienced dramatically less number of deaths in comparison. The question that remains is why far more males experiencing homelessness die due to drug toxicity and how can we tailor our services to support them better.

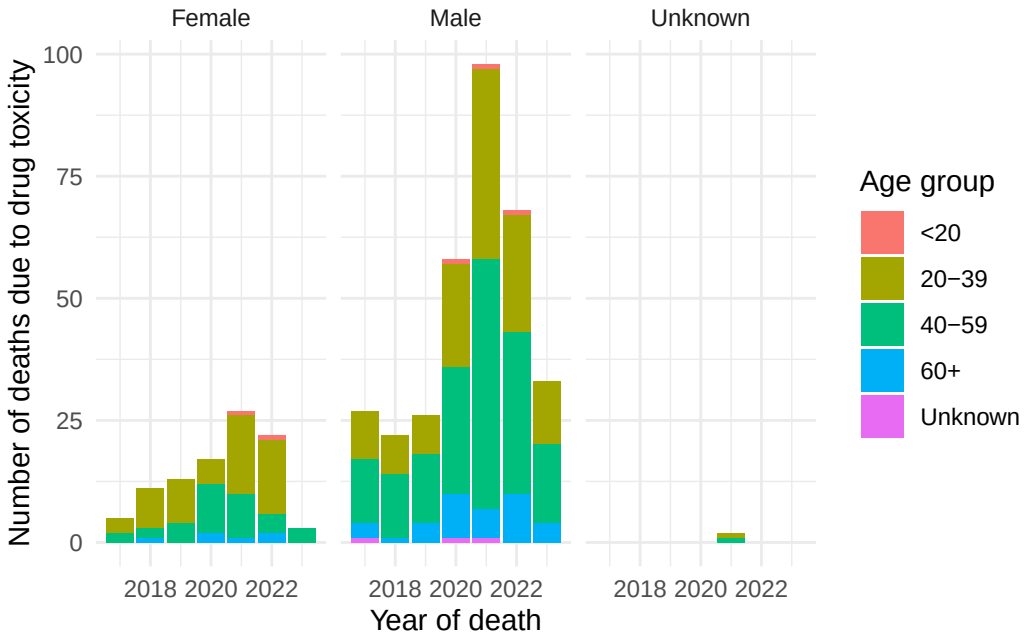

Figure 2: Relationship between the number of deaths due to drug toxicity for each age group and gender from 2017 to 2023

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