

Investigating drug toxicity as the major cause of death for people experiencing homelessness.*

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January 22, 2024

Statistics on deaths for people experiencing homelessness was collected from Open Data Toronto to analyze the nine major causes of death for homeless people from the year of 2017 to 2023. After summarizing the data, we were able to identify drug toxicity as the leading fatal cause for homeless people that should be addressed for. In this paper, we will further investigate the association with the issue of substance abuse and homelessness, aiming to provide a few explanations to the consistently high number of deaths on account of drug abuse.

1 Introduction

Homelessness has always been a widely discussed and concerned topic in Canada. Canadian Definition of Homelessness (Gaetz et al. 2012) described homelessness as an individual being stuck in a dilemma who is incapable of acquiring “stable, permanent, appropriate housing”. Indeed, when the term “homelessness” was ever brought up, we were immediately reminded of its bonded correlation with the housing issue. However, in this report, we wish to address another underrepresented while pressing problem that is also constantly bonded with homeless people.

As one of the most populated city in Canada, Toronto deals with a great figure of homeless people everyday. According to statistics reported (Victor 2023), there are over 9000 people experiencing homelessness every night in city of Toronto. While the government and public focused their attention primarily on solving the housing issue, such as providing shelters and subsidized housing, substance abuse has become a comparably urging issue for these people. In 2010, BMC Public Health (Grinman et al. 2010) collected a shockingly high percentage of drug-taking problem in the 1191 study samples. About forty percent of these homeless individuals was found to have some related drug abuse issues, and trends of diminishing mental health

*Code and data are available at: https://github.com/dai929/Toronto_Homelessness.git

status were also concluded in the article. There are many reasons for an individual to start doing drugs; examples include weak self-control, poor quality of living standards leading to poor mental health status, and so on. The definition of homelessness undoubtedly helps to fit in these lines of description for substance abuse.

To investigate the relationship between the topics of homelessness and drug abuse in advance, this paper pulls data about deaths for people experiencing homelessness by causes from Open Data Toronto (Data 2023) and analyzes the dataset with tables and graphs. Under the Data section, I will discuss the steps of cleaning and graphing the summarized data, which are used to support the main findings of this paper.

2 Data

The dataset utilized in this paper was taken from the City of Toronto’s Open Data Toronto package (Gelfand 2022) and is entitled “Deaths of People Experiencing Homelessness” (Data 2023). Data was collected, cleaned and analyzed using the statistical programming software R (R Core Team 2022), with additional support from R packages “tidyverse” (Wickham et al. 2019), “dplyr” (Wickham et al. 2023), “readr” (Wickham, Hester, and Bryan 2024), “janitor” (Firke 2023), “knitr” (Xie 2014), “here” (Müller and Bryan 2020) and “ggplot2” (Wickham 2016).

2.0.1 Dataset Overview

Our primary raw dataset is a summary of death counts for homeless people, beginning with the year of 2017 and being categorized by nine major causes of death. Categories with less interest and focus were “Age_group” and “Gender”, which we chose to neglect in this paper. I cleaned this raw data by eliminating the two columns mentioned before and simplifying the names if necessary. Next, noted that there are duplication under the column “Cause_of_death”. I combined identical causes of death for each year and summed up the counts.

Table 1: Sample of Cleaned Death Counts for Homeless People by Causes Dataset

Year	Cause of Death	Count
2017	Accident	5
2017	Cancer	9
2017	Cardiovascular Disease	14
2017	Drug Toxicity	32
2017	Homicide	1
2017	Other	8
2017	Pneumonia	3
2017	Suicide	3

Year	Cause of Death	Count
2017	Unknown/Pending	25

Table 1 provided with the sample observations from the year of 2017, and we can easily identify the largest number of counts under Drug Toxicity, which aligned with our assumption. In the cleaned dataset, this finding is not the solo case. With the data collected, we found drug toxicity remained to be the largest cause of death for the following years. In Table 2, we will extract out rows of drug toxicity and look at this major cause of death solely for each year and analyze the trends behind those numbers.

Table 2: Subset of Drug Toxicity

Year	Cause of Death	Count
2017	Drug Toxicity	32
2018	Drug Toxicity	33
2019	Drug Toxicity	39
2020	Drug Toxicity	75
2021	Drug Toxicity	127
2022	Drug Toxicity	90
2023	Drug Toxicity	36

The number of deaths caused by substance abuse spiked from the year of 2020 to 2022 and reaches a peak of 127 deaths in 2021. Possible explanations for this trend can be argued due to the outbreak of COVID-19 pandemic. Unstable communities and individuals are more affected by the pandemic, since they lack stable economic income and housing. The issue of drug addictive can be much more severe and lethal in this three years. This also explains the descending death counts caused by drug-taking in 2023. As a result, we are able to associate homelessness with substance abuse and see how social instability impacted those individuals and urged drug use as a relieve of stresses and strains of public life.

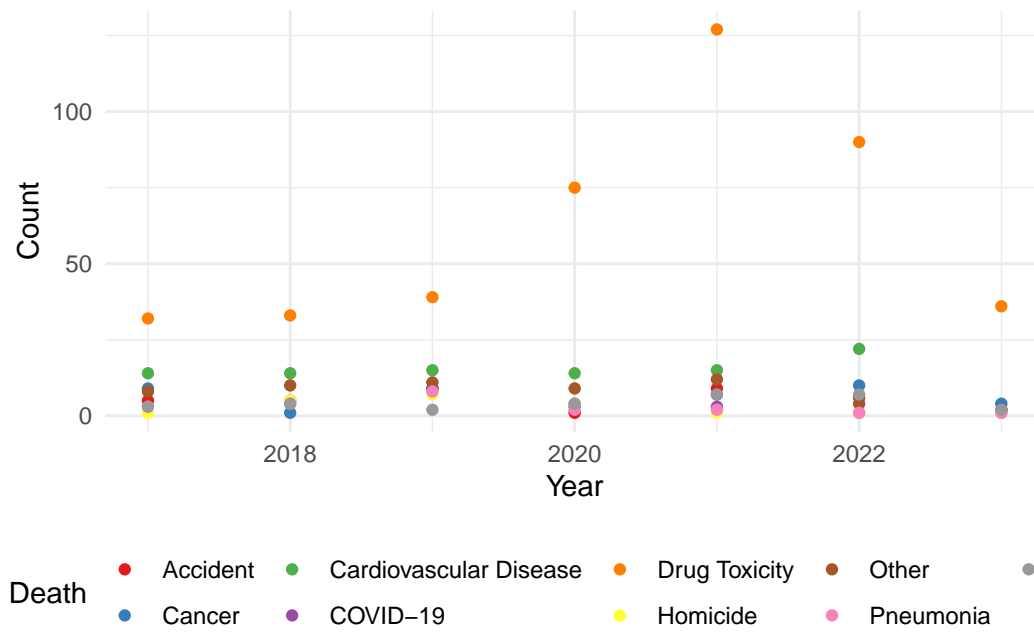


Figure 1: Graph of Death Counts by Causes of Death over Time

Figure 1 indicated the relationship between the count of deaths and the year in which the data was recorded and highlighted the causes of death by different colours. After we plotted out every sample point on the analyzed dataset, we obtained a better understanding and visual realization of how drug toxicity stands to be the major cause of death for individuals experiencing homelessness. As other causes of death appears to be minor comparing to drug abuse, it is important for us to inform and stress this finding in our analysis.

Our results suggest that the problem of substance abuse has become the largest cause of death for homeless people. In addition, our data proposes a possible connection between deaths of homeless individuals due to drug toxicity and social instability.

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