Trends in Paramedic-Attended Opioid Overdoses:

A Review of Suspected Opioid Overdoses in Toronto Paramedic Services Data, 2017/18

November 2018

416.338.7600 toronto.ca/health | Toronto Public Health

Reference:

Toronto Public Health. Trends in Paramedic-Attended Opioid Overdoses: A Review of Suspected Opioid Overdoses in Toronto Paramedic Services Data, 2017/18. November 2018.

Authors:

Jennifer Liang, Kandace Ryckman, Liz Corson

Acknowledgements:

We appreciate and acknowledge the expertise and assistance provided by the following Toronto Public Health staff: Shusmita Rahman, Joseph Ariwi, Sarah Collier, Jayne Caldwell, and Rita Shahin.

We would like to thank Toronto Paramedic Services for providing the data necessary to complete these analyses. Specifically, we would like to thank the following individuals for their contributions: Chris Olynyk, Adam Thurston, and Dr. Russell MacDonald.

Disclaimer:

The views expressed in this report represent those of Toronto Public Health, and do not represent those of the collaborating agencies. Any questions regarding the statements and interpretations contained herein should be addressed to Toronto Public Health.

Copies:

This report can be downloaded at: www.toronto.ca/health/overdosestats

For further information:

Toronto Public Health
Surveillance and Epidemiology Unit
277 Victoria Street, 7th Floor
Toronto, Ontario, M5B 1W2
Telephone: 416-338-7600

TABLE OF CONTENTS

EXECUTIVE SUMMARY

INTRODUCTION

Toronto is in the midst of a noted increase in suspected opioid overdoses, but data needed to inform effective response is limited. To help fill this gap, Toronto Public Health (TPH) obtained data on paramedic-attended suspected opioid overdoses from Toronto Paramedic Services (TPaS) as part of a data sharing agreement. The data include information on patient demographics, location of call, time of call, and naloxone administration, and are provided to TPH on a daily basis. The information yielded from this partnership provides an increased understanding of trends in suspected opioid overdoses in Toronto.

TRENDS IN SUSPECTED OPIOID OVERDOSE CASES

Between August 3, 2017 and August 2, 2018, TPaS attended 3,203 suspected opioid overdose calls, 161 of which were fatal cases. Sixty-five percent (65%) of the cases were male, and the mean age of all patients was 40 years of age.

Paramedics attended to a higher volume of suspected opioid overdose cases in summer months compared to winter months. A higher proportion of suspected opioid overdose cases were reported to paramedics from early afternoon to late evening compared to the early morning. Paramedics also attended more calls on days during social-assistance payment periods compared to the rest of the month.

During the year of data collection, the highest concentration of calls for suspected opioid overdoses were in the downtown neighbourhoods; however, neighbourhoods with both a high number of cases and a high fatality rate were dispersed across the city. Naloxone administration by bystanders prior to paramedic arrival varied by neighbourhood. Church-Yonge Corridor, Waterfront Communities-The Island, and the Bay Street Corridor neighbourhoods had a high volume of suspected opioid overdose cases but low rates of bystander naloxone administration prior to paramedic arrival.

IMPLICATIONS AND NEXT STEPS

This report marks one year of consecutive data collection and analysis of paramedic calls for suspected opioid overdoses in Toronto. Findings suggest the need to allocate public health and harm reduction resources targeted to specific time periods and neighbourhoods with high opioid overdose call activity. Further long-term data collection of TPaS opioid overdose cases is needed to provide a more detailed understanding of the implications of the calls to paramedics for opioid overdoses in Toronto and to inform appropriate responses to address this issue from a public health perspective.

INTRODUCTION AND CONTEXT

In 2017, 1 in 4 Ontario opioid deaths occurred in Toronto[1]. Opioid overdose is an urgent public health issue. Deaths from opioid-related causes in the city have increased every year since 2013, and 2017 had a 121% increase in deaths compared to 2015[1].

'Real-time' data sources specific to opioid use and overdose symptoms are not well developed but are needed to understand the magnitude of this serious public health issue. A collaboration between Toronto Public Health (TPH) and Toronto Paramedic Services (TPaS) allows for timely information gathering about suspected opioid overdoses identified through patient contacts and care delivered by paramedic services.

These calls include more suspected opioid overdose cases than alternative data sources such as emergency department visits, which have some key limitations. Although the Chief Coroner for Ontario reports information about lives lost to opioid toxicity, it takes months before death investigations are complete and this information becomes available. The preliminary identification of suspected opioid overdose deaths as well as non-fatal cases by TPaS and subsequent sharing of information occurs in a timely manner, and can be used to provide an early warning to communities when increases in opioid overdoses occur.

This report provides TPH's review of one year of TPaS data, collected between August 3, 2017 and August 2, 2018. Trends in the number and proportion of suspected opioid overdose cases by patient demographics, time of day, and geographic location were examined to provide a better understanding of opioid overdose in Toronto.

This report may be used for planning harm reduction services and targeting overdose prevention outreach during high-risk time periods and in neighbourhoods where people may be at higher risk of overdose harms.

DATA

TPaS maintains an electronic patient care record (ePCR), which is completed by the responding paramedics after each 911 emergency medical call. The ePCR contains information on time, location, patient demographics, clinical interventions, and a narrative description of each case.

The data reviewed in this report includes ePCR records identified as a "suspected opioid overdose" by the attending paramedic. Please see appendix A for a working definition of suspected opioid overdose. The data include information on patient demographics, location of call, time of call, severity of the case, and naloxone administration. If no patient identification was available to the paramedic on scene, age and sex was determined at their discretion.

ANALYSIS

All cases reported between August 3, 2017 and August 2, 2018 were included in this review. Cases are noted as *suspected* opioid overdose cases as the final diagnosis in hospital may differ from initial assessment by paramedics. Cases were noted as fatal if the patient died on scene or was discovered dead on scene and the Coroner was notified. Cases that were later

registered as fatal after paramedic transfer to hospital are not recorded as fatal in this data source.

Analyses of the data were conducted by demographics, time, and geography. The analysis of suspected opioid overdose by day and by hour were conducted with non-fatal suspected opioid overdose cases only. This was conducted due to the potential inconsistency between the occurrence of a fatal suspected opioid overdose case and the time and day when it was attended by paramedic services.

LIMITATIONS

The case definition of 'suspected opioid overdose' has not been validated. Paramedics identify cases as such when the patient or patients exhibit symptoms consistent with an opioid overdose based on their clinical judgement and the working definition provided in the appendix. The specificity and sensitivity of this case definition has not been currently been determined.

The data presented represents the number of suspected cases. It has not been standardized to the TPaS call volume in that neighbourhood. Paramedic responses for suspected overdoses represent approximately 1% of the call volume serviced by TPaS each year. The data and interpretations presented in this report bears no reflection on the delivery of paramedic services within that neighbourhood.

This data source only includes suspected opioid overdose cases that involve a call to 911. The data do not provide a complete representation of all suspected opioid overdoses. Though the data from Toronto Paramedic Services includes a large number of cases, it likely underestimates the true burden of opioid overdose in Toronto.

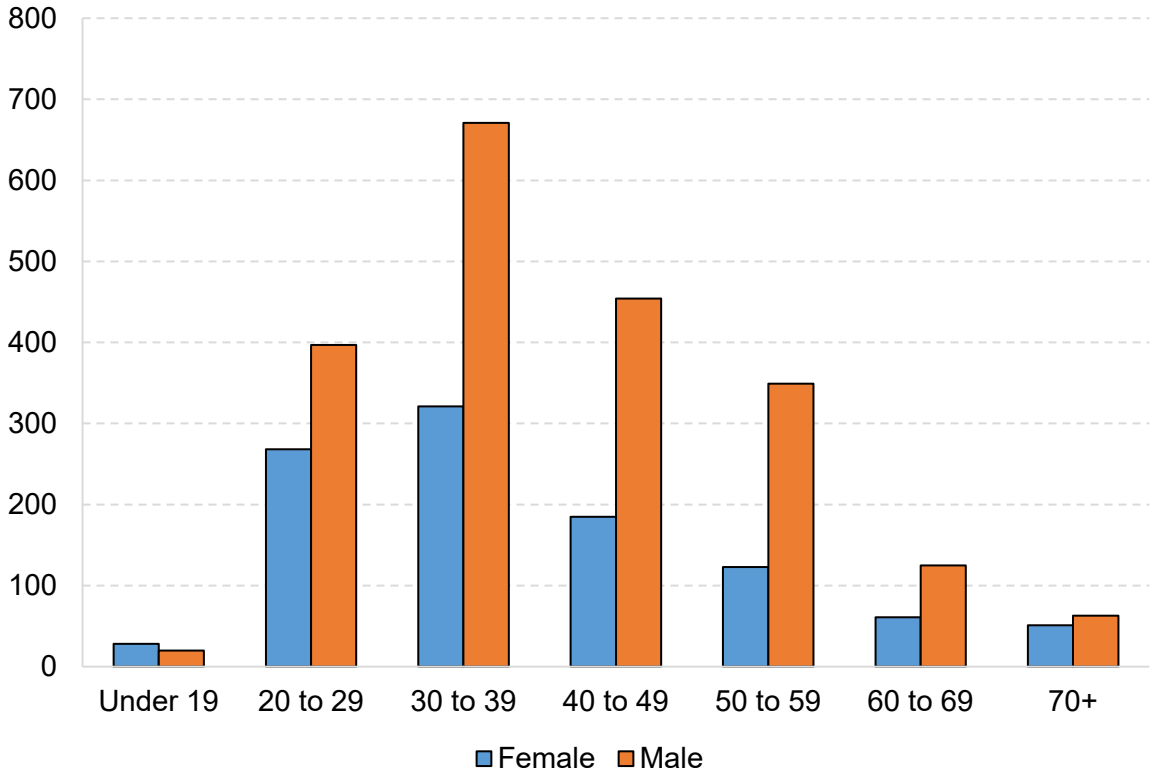
RESULTS

During the reporting period, paramedics attended to 3,203 patients with suspected opioid overdose, of which 161 (5%) were fatal.

DEMOGRAPHICS

Figure 1 shows the distribution of suspected opioid overdose cases attended by TPaS by age range and sex. The majority of cases were male patients (65%) and the age range with the greatest proportion of both male and female patients was 30 to 39 (31%).

Figure 1: Number of suspected opioid overdose cases by age and sex, Toronto, August 3, 2017 to August 2, 2018

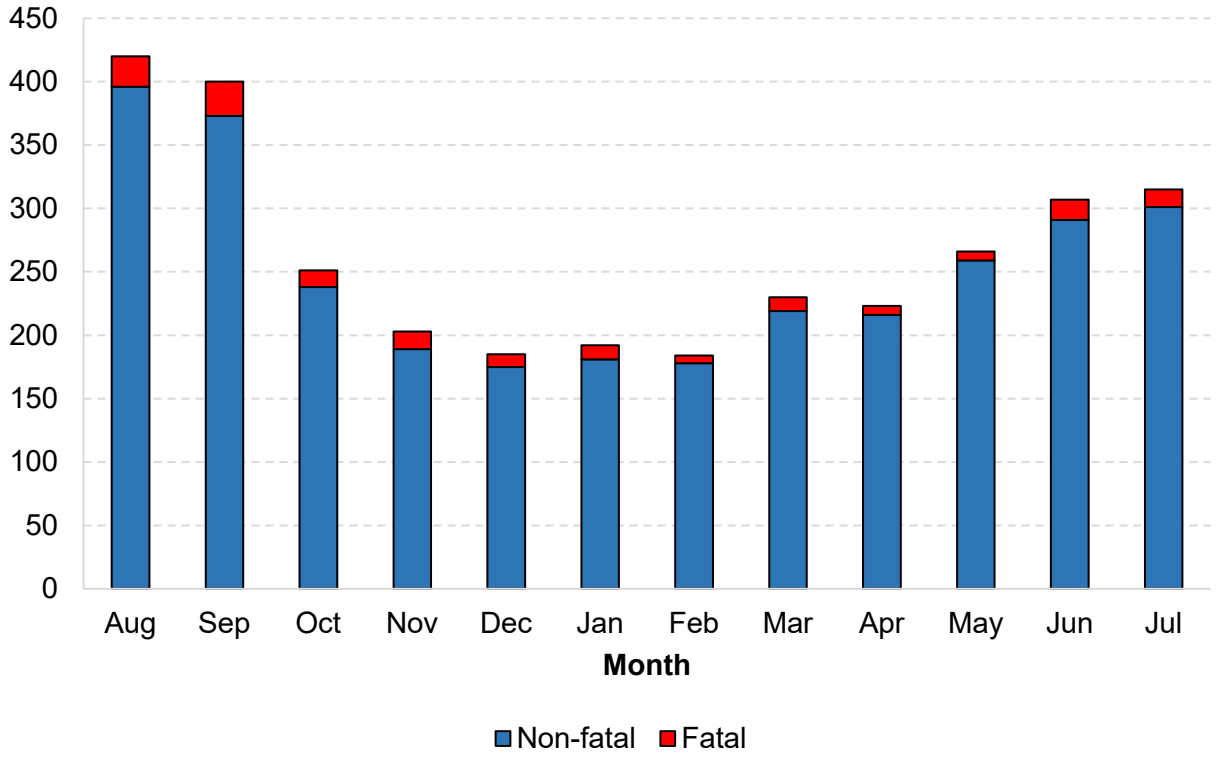


Data Source: Toronto Paramedic Services. Electronic Patient Care Record. August 3, 2017 to August 2, 2018.

TRENDS OVER TIME

Figure 2 shows the number of fatal and non-fatal suspected opioid overdose cases attended by TPaS by calendar month. The number of suspected opioid overdose cases attended by TPaS was lower during the winter months (December 2017 to February 2018), compared to the summer months (August 2017 and June to July 2018).

Figure 2: Number of fatal and non-fatal suspected opioid overdose cases by month, Toronto, August 3, 2017 to July 31, 2018



Data Source: Toronto Paramedic Services. Electronic Patient Care Record. August 3, 2017 to August 2, 2018.

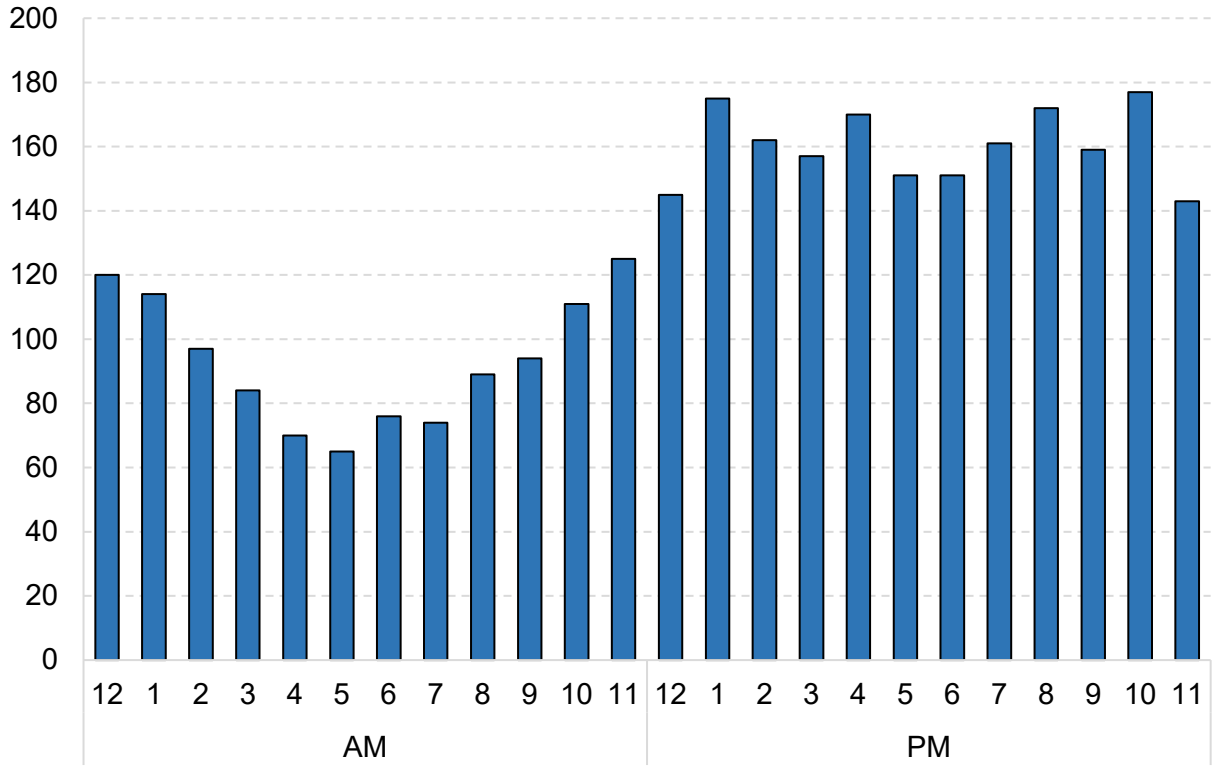
Analysis of non-fatal suspected opioid overdose cases by day of the week found Friday contained the highest proportion of reported cases at 16% while Monday had the lowest at 12%.

Weekends (Friday to Sunday) had a mean number of 9.1 reported cases per day compared to the weekdays (Monday-Thursday) at 8.5 reported cases per day.

Figure 3 shows the number of non-fatal suspected opioid overdose cases attended by TPaS by hour of the day.

A higher number of cases were attended by TPaS in the afternoon and evening compared to the early morning. The highest number of cases were recorded between 1 pm and 10 pm, whereas the lowest number of cases were found between 4 am and 7 am.

Figure 3: Number of non-fatal suspected opioid overdose cases by hour of the day, Toronto, August 3, 2017 to August 2, 2018



Data Source: Toronto Paramedic Services. Electronic Patient Care Record. August 3, 2017 to August 2, 2018.

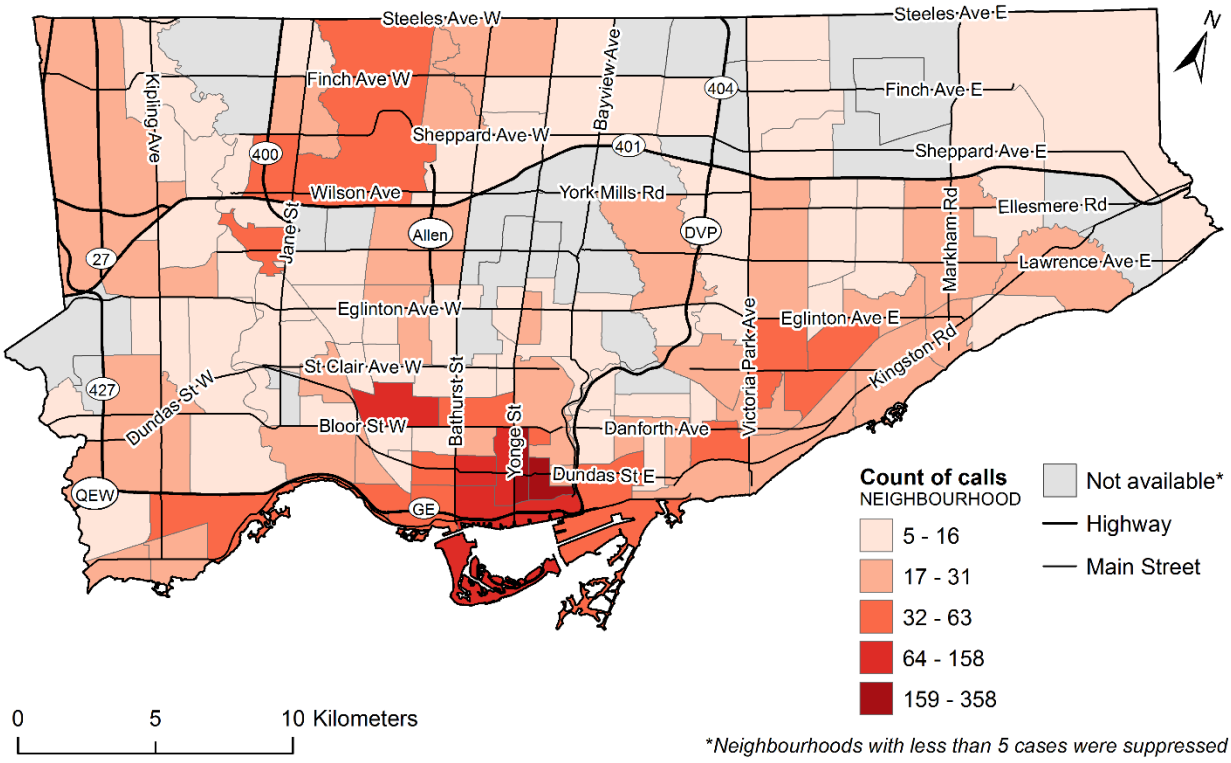
Previous observations from British Columbia indicated an increase in opioid overdose deaths around social-assistance periods[3]. In this analysis of Toronto opioid overdoses, social-assistance periods were defined as the last business day of the month when funds were released and the three days immediately following. The mean number of calls to paramedics for suspected opioid overdoses was significantly higher if the day fell during a period of social-assistance payment compared to when the day fell on a period without social-assistance. The mean number of calls during a day within a social-assistance payment period was 11.0 and not within a social-assistance payment period was 8.5.

TORONTO NEIGHBOURHOOD COMPARISONS

Figure 4 shows the number of suspected opioid overdose calls attended by paramedics by neighbourhood. Areas shaded with a darker red have a higher volume of calls.

Calls for suspected opioid overdose cases attended by TPaS were concentrated in the downtown core. The Church-Yonge Corridor neighbourhood had the highest number of total calls (358) followed by the nearby Moss Park neighbourhood (337) and the Bay Street Corridor neighbourhood (158).

Figure 4: Suspected opioid overdose cases attended by paramedics by neighbourhood, Toronto, August 3, 2017 to August 2, 2018



Data Source: Toronto Paramedic Services. Electronic Patient Care Record. August 3, 2017 to August 2, 2018.

Additional information about paramedic responses by neighbourhood and intersection can be found in the report 'Calls to Paramedic Services for Suspected Opioid Overdoses Geographic Information' (available at www.toronto.ca/health/overdosestats).

NALOXONE USE

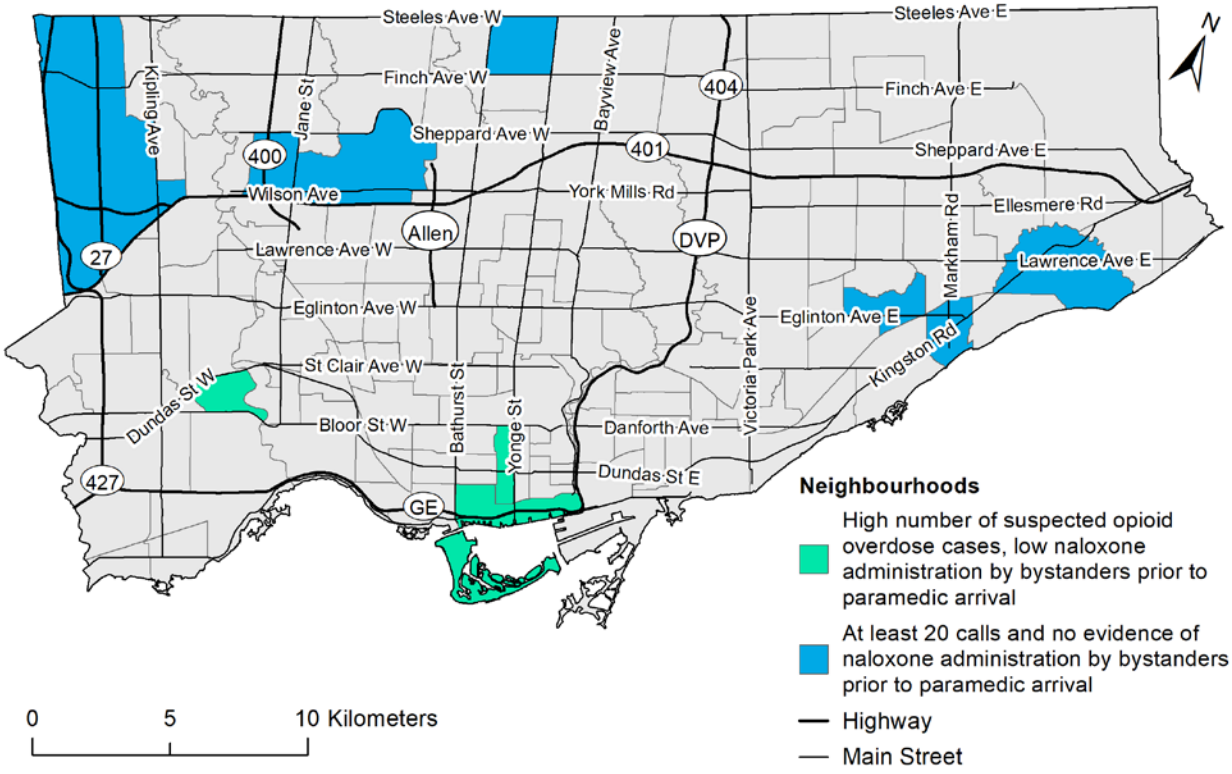
Naloxone administration during an opioid overdose may temporarily block the effects of the opioid quickly. Naloxone was administered by bystanders prior to paramedic arrival in 19% of the suspected opioid overdose cases attended by paramedics across the city. Some neighbourhoods with a high number of suspected opioid overdose cases had a low frequency of

naloxone administration prior to paramedic arrival. These areas include the Church-Yonge Corridor (358 cases, 11% naloxone administration), Waterfront Communities-The Island (98 cases, 11% naloxone administration) and the Bay Street Corridor (158 cases, 5% naloxone administration). Figure 5 shows these neighbourhoods on a map.

Neighbourhoods with at least 20 calls and no evidence of naloxone administration by bystanders prior to paramedic arrival included:

- Downsview-Roding CFB
- Eglinton East
- Newtonbrook West
- Scarborough Village
- West Hill
- West Humber-Clairville

Figure 5: Neighbourhoods with a low frequency of bystander naloxone administration before paramedic arrival



Data Source: Toronto Paramedic Services. Electronic Patient Care Record. August 3, 2017 to August 2, 2018.

CASE FATALITY RATE

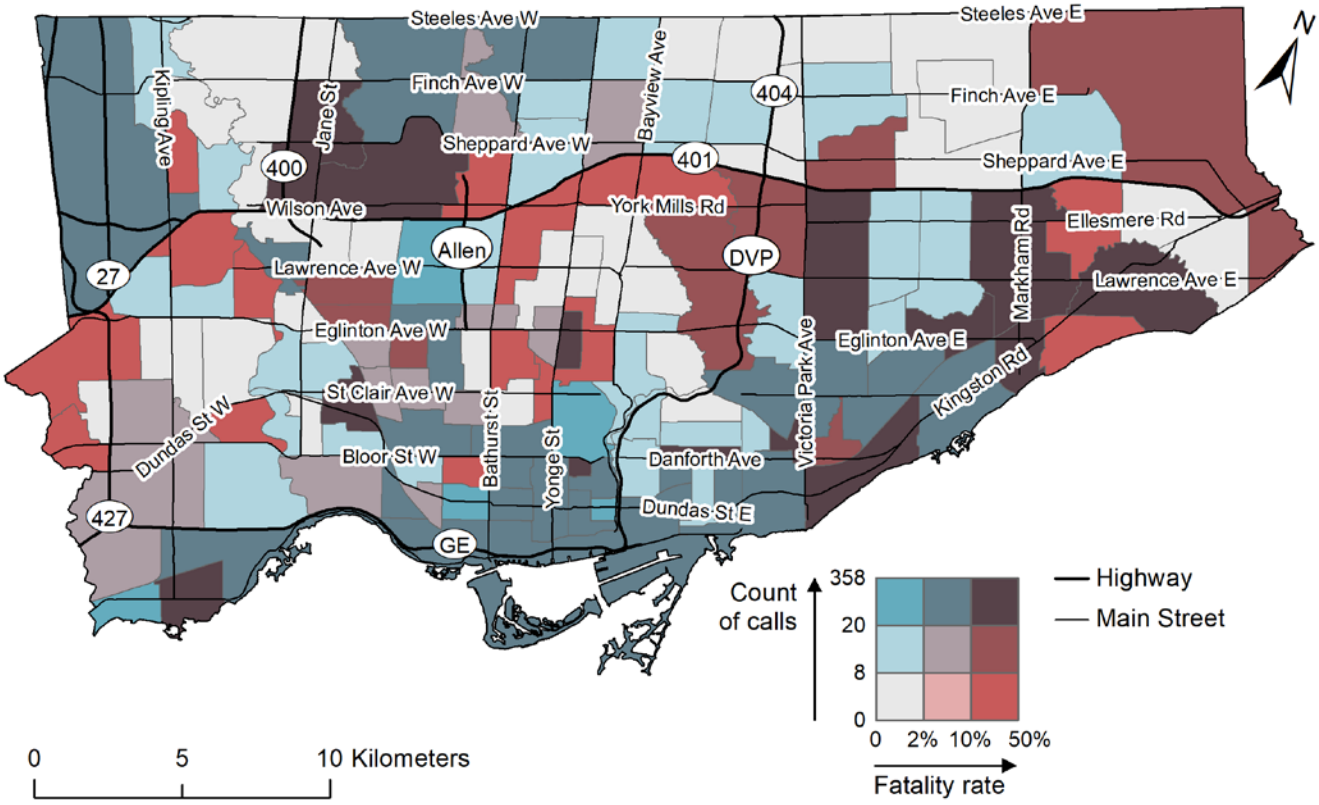
Figure 6 shows suspected opioid overdose calls attended by paramedics and associated fatality rate by neighbourhood. Areas with a high number of calls and a high fatality rate are areas of interest for this analysis and are represented by neighbourhoods in the darkest colour.

Neighbourhoods with both a high number of calls and a high fatality rate are dispersed around the city and not concentrated in the downtown core. Areas of interest include a group of

neighbourhoods in the north-west around Glenfield-Jane Heights and Downsview-Roding CFB as well as Scarborough Village, Woburn, Eglinton East and West Hill.

The data presented represents the number of suspected cases of opioid overdoses. It has not been standardized to the TPaS call volume in that neighbourhood. Paramedic responses for suspected overdoses represent approximately 1% of the call volume serviced by TPaS each year. The data and interpretations presented in this report bears no reflection on the delivery of paramedic services within that neighbourhood.

Figure 6: Suspected opioid overdose case attended by paramedics and fatality rate by neighbourhood, Toronto, August 3, 2017 to August 2, 2018



Data Source: Toronto Paramedic Services. Electronic Patient Care Record. August 3, 2017 to August 2, 2018.

IMPLICATIONS

This review of the first year of TPaS data for suspected opioid overdoses provides a new level of understanding of the demographic, temporal, and geographic distribution of the opioid overdose epidemic in Toronto. Of the 3,203 suspected opioid overdose cases attended by paramedics between August 3, 2017 and August 2, 2018, 161 of the cases were fatal. The findings outlined in this report provide preliminary evidence to inform and direct delivery of harm reduction services, such as naloxone distribution and targeted opioid overdose prevention outreach, during high-risk periods and in high-risk areas of the city.

The review highlights an increase in suspected opioid overdose cases in the summer months and from early in the afternoon to late in the evening each day. Social-assistance payment periods also coincide with a higher number of suspected opioid overdose cases. Current and future overdose prevention sites, supervised injection sites, and other harm reduction services may need to allocate resources to address these identified higher-risk periods.

The downtown neighbourhoods of the Church-Yonge Corridor, Waterfront Communities-The Island, and the Bay Street Corridor were identified as neighbourhoods with a high volume of suspected opioid overdose cases but limited naloxone administration by bystanders prior to paramedic arrival. The neighbourhoods of Downsview-Roding CFB, Eglinton East, Newtonbrook West, Scarborough Village, West Hill, and West Humber-Clairville were identified with at least 20 suspected opioid overdose cases during the year of data collection but with no naloxone administration by bystanders prior to paramedic arrival. These neighbourhoods may benefit from increased naloxone distribution resources. Downtown neighbourhoods and peripheral neighbourhoods with high fatality rates may also benefit from increased resources.

The examination of trends in calls to paramedics for suspected opioid overdose can inform situational awareness and planning for Toronto Public Health and community stakeholders, as well as future long-term data collection needs on opioid overdose cases. Further continuation of TPaS data collection can provide more detailed trends and findings to inform overdose prevention and response planning from a public health perspective within City and community services.

APPENDIX A: SUSPECTED OPIOID OVERDOSE CASE DEFINITION

A probable opioid overdose* **includes** cases with:

- Respiratory rate (RR ≤ 10);
- AND Level of consciousness (LOC)
  - Glasgow Coma Score < 15 or
  - observed decrease in LOC or
  - decreased LOC by witness report or
  - responsive to painful stimulus only or
  - unresponsive to external stimulus;
- AND Documentation of opioid use:
  - related to current incident (including evidence of drug paraphernalia or witness report), or in client/patient history; or
  - Pupils (pinpoint or constricted or ≤3 mm).

OR

- Documentation of a positive response to naloxone, noted by improvements in any of:
  - Respiratory rate or
  - Pupil size or
  - Level of consciousness (LOC).

A probable opioid overdose **excludes** cases with obvious other cause for patient condition.

*The purpose of this case definition is to provide clarity on the distinction between 'intoxication' and 'overdose'.

DATA NOTES

- Main indicators for analysis were determined to be fatal suspected opioid overdose cases and non-fatal suspected opioid overdose cases.
- The main indicators were stratified by variables of interest during analysis to calculate proportion or mean.
- Sex of patient is identified as female, male, or unknown by paramedic assessment.
- Age is aggregated into 10-year age groups.
- Naloxone administration is classified as occurring before arrival of paramedic, given by paramedic or not mentioned in the case description.
- Suspected opioid overdose case location is mapped by latitude and longitude coordinates as well as address and nearest intersection. Neighbourhood boundary was used for geographic analysis.
- Suspected opioid overdose cases located outside the boundaries of the City of Toronto were not included in this analysis.
- Data is not standardized for population within a given neighbourhood. Data on the population at risk within a given neighbourhood at a given time is not possible to obtain, as individuals do not necessarily overdose in the area in which they live or work. In addition, many people who use drugs have no fixed address.

- Data is not standardized for TPaS call volume by neighbourhood, and represents only approximately 1% of overall TPaS call volume.

REFERENCES

1. Ontario Agency for Health Protection and Promotion (Public Health Ontario). (2018). Interactive Opioid Tool. Toronto, ON: Queen's Printer for Ontario. https://www.publichealthontario.ca/en/dataandanalytics/pages/opioid.aspx

2. Ambrose, G., Amlani, A., Buxton, J. A. (2016). Predictors of seeking emergency medical help during overdose events in a provincial naloxone distribution programme: a retrospective analysis. BMJ Open, e011224. doi:10.1136/bmjopen-2016-011224

3. Otterstatter, M. C., Amlani, A., Guan, T. H., Richardson, L. (2016). Illicit drug overdose deaths resulting from income assistance payments: Analysis of the "check effect" using daily mortality data. International Journal of Drug Policy, *33*, 83-87.