Interior Health

November 4, 2021

Mariah VanZerr
Strategic Transportation Planning Manager
City of Kelowna
1435 Water Street
Kelowna, BC V1Y 1J4

Sent via email: MVanZerr@kelowna.ca

Dear Mariah VanZerr,

Re: City of Kelowna – E-scooters and Health Evidence

We are pleased to provide you with a preliminary report on the health impact of the Kelowna shared e-scooter program. This report addresses the request for information from City of Kelowna staff and Council due to concerns about the increased demand of acute care services due to injuries soon after the pilot implementation.

A team at Interior Health has compiled and analyzed emergency department presentations and admissions related to scooter injuries at the Kelowna General Hospital. Our preliminary findings point towards a correlation between the e-scooter program implementation and injury presentations such as fractures, abrasions and head injuries. These injuries were mainly the result of falls from e-scooters that typically occurred on roads, but also on sidewalks.

With emerging technologies there is an opportunity to pilot, evaluate and adopt new modes of transportation and recreation for our community to enjoy. In order to ensure these initiatives are implemented in a safe manner, we offer the following recommendations:

1. Implement evidence informed policies on emerging technologies to maximize the benefits of the program and mitigate any potential risks.
2. To continue the collaboration between Interior Health and the City of Kelowna in order to monitor any health and acute care impacts of e-scooters in our community.
3. Seek direction from the Ministry of Transportation and Infrastructure for the program moving forward and provincial support for collecting health-related evidence as it relates to e-scooter use.

Interior Health would like to thank the City of Kelowna for the opportunity to share our feedback on the shared e-scooter program. We welcome the opportunity to continue to collaborate with City staff on this and other topics in the context of our partnership to build healthy environments for community members.

Please do not hesitate to reach out with questions or concerns.

Sincerely,

Silvina Mema, MD, MSC, FRCPCP
Medical Health Officer

Kelly MacDonald, BA, MA
Healthy Communities – Community Health Facilitator

cc: IHA: Dr. Sue Pollock, Roger Parsonage, Heather Deegan & City of Kelowna: Doug Gilchrist
Enclosure: E-scooter Health Data Report (injury data, analysis, recommendations)

We recognize and acknowledge that we are collectively gathered on the traditional, ancestral, and unceded territories of the seven Interior Region First Nations, where we live, learn, collaborate, and work together. This region is also home to 15 Chartered Métis Communities. It is with humility that we continue to strengthen our relationships with First Nation, Métis, and Inuit peoples across the Interior.

E-scooter related injuries in Kelowna, B.C.

Prepared by Dr. Sumeet Sekhon, PhD and Kelly MacDonald, MA & Sylvia El Kurdi, MPH MSc

I. Statement of Purpose

The purpose of this report is to provide a summary analysis of e-scooter related injury data collected by the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP) program, in order to inform decision making regarding the e-scooter sharing program initiated in Kelowna in April, 2021.

II. Introduction to Study

In April 2021, the Ministry of Transportation and Infrastructure launched the provincial Active Transportation Pilot Project. Enacted under Part 13 of the Motor Vehicle Act this project permitted the use of electric kick scooters on the roads of six pilot site communities for a 3-year term. The project is connected to the Provincial Government's goal to reduce greenhouse gas emissions from the transportation sector and aligns with the Move. Commute. Connect: B.C.'s Active Transportation Strategy. The stated goal of the program is to research, test and evaluate safety and potential of electric kick scooters to:

- Reduce traffic congestion;
- Provide first and last mile connections to public transit; and,
- Support government's goal to expand active transportation networks.

Shared e-scooters became available to Kelowna residents in the spring of 2021 as part of the provincial pilot program. Soon after the introduction of the program in April, injuries among e-scooter riders became a cause for concern for physicians at the Kelowna General Hospital (KGH). In particular statements were circulated in the media about e-scooters being "fracture machines" and calling for them to be removed from Kelowna's roadways.

In response to the concern the City of Kelowna asked Interior Health (IH) to compile and analyze any available data on e-scooter related injuries in Kelowna to better understand the number and nature of injuries that were caused by e-scooter use in the community; compare the rates and types of injuries seen in Kelowna to other jurisdictions; and to provide any key program changes warranted based on analysis of the relevant health data.

This report has been prepared at the request of the Medical Health Officer to understand the impact of the program and inform the City of Kelowna's program. The report contains an epidemiological analysis of e-scooter related injury data extracted from the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP) program. Moreover, this report compares and contrasts Kelowna's data with e-scooter injury data from a number of European and U.S. cities, and makes policy recommendations based on an extensive review of best practices pulled from shared e-scooter programs from across the globe.

III. E-scooter Injury Data from Kelowna General Hospital

Injury data collected for this report was sourced through the Canadian Hospitals Injury Reporting and Prevention Program (CHIRRP) database at KGH. CHIRPP is a surveillance system initiated by the Public Health Agency of Canada that collects injury data from emergency department across the country. The KGH CHIRPP team performs chart reviews and when possible patient interviews to collect relevant

information on injuries. It should be noted that there are limitations to retrospective data collection and analysis.

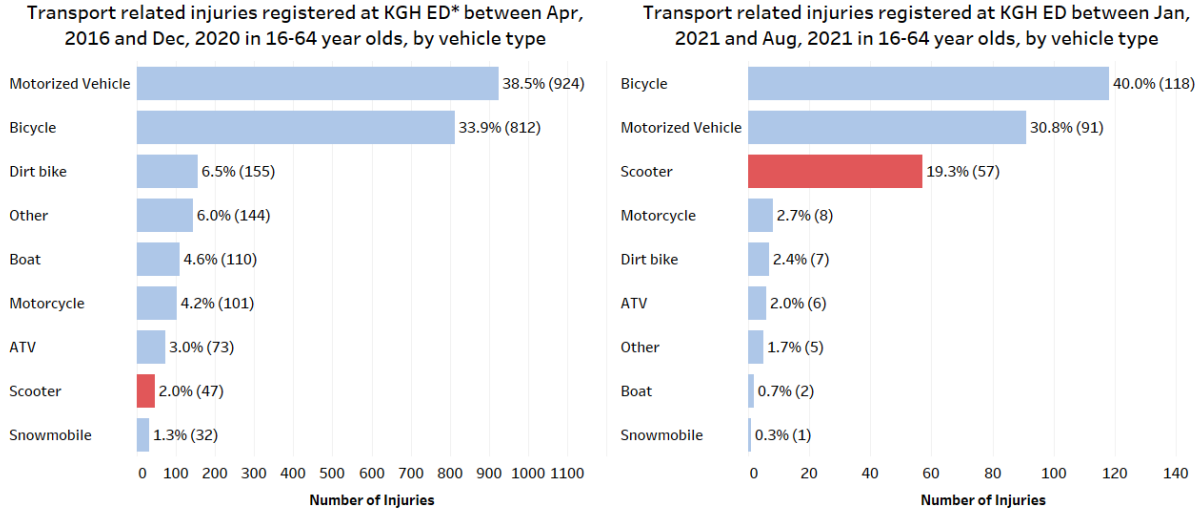
3.1 Data Limitations

Of note, the IHA surveillance system has some important limitations in terms of comparing injuries before and after the program was implemented. Firstly, without a dedicated 'e-scooter' flag, there is a challenge in mining relevant data exclusive to electric kick scooters, and excluding data related to other types of scooters (eg. Mobility scooters or unpowered scooters). Secondly, comparison across time is challenging because there is the potential for overrepresentation in the data after a dedicated 'e-scooter flag' has been added. Finally, it is challenging to compare data for the time period before the shared e-scooter program to post pilot launch because data was collected differently for those time periods. Prior to June 2021 the type of scooter involved in an injury was not regularly or discernibly recorded. Therefore, a margin of error that must be recognized in the comparison analysis, and underrepresentation of e-scooter injuries in the pre-pilot time period (April 2016-December 2020) is likely. Considerable efforts were made by the epidemiologist to minimize confounding variables and we have a degree of confidence in the data presented here because of it's alignment with information found in the extensive, existing literature on the subject.

3.2 Rise in scooter-related injuries in 2021

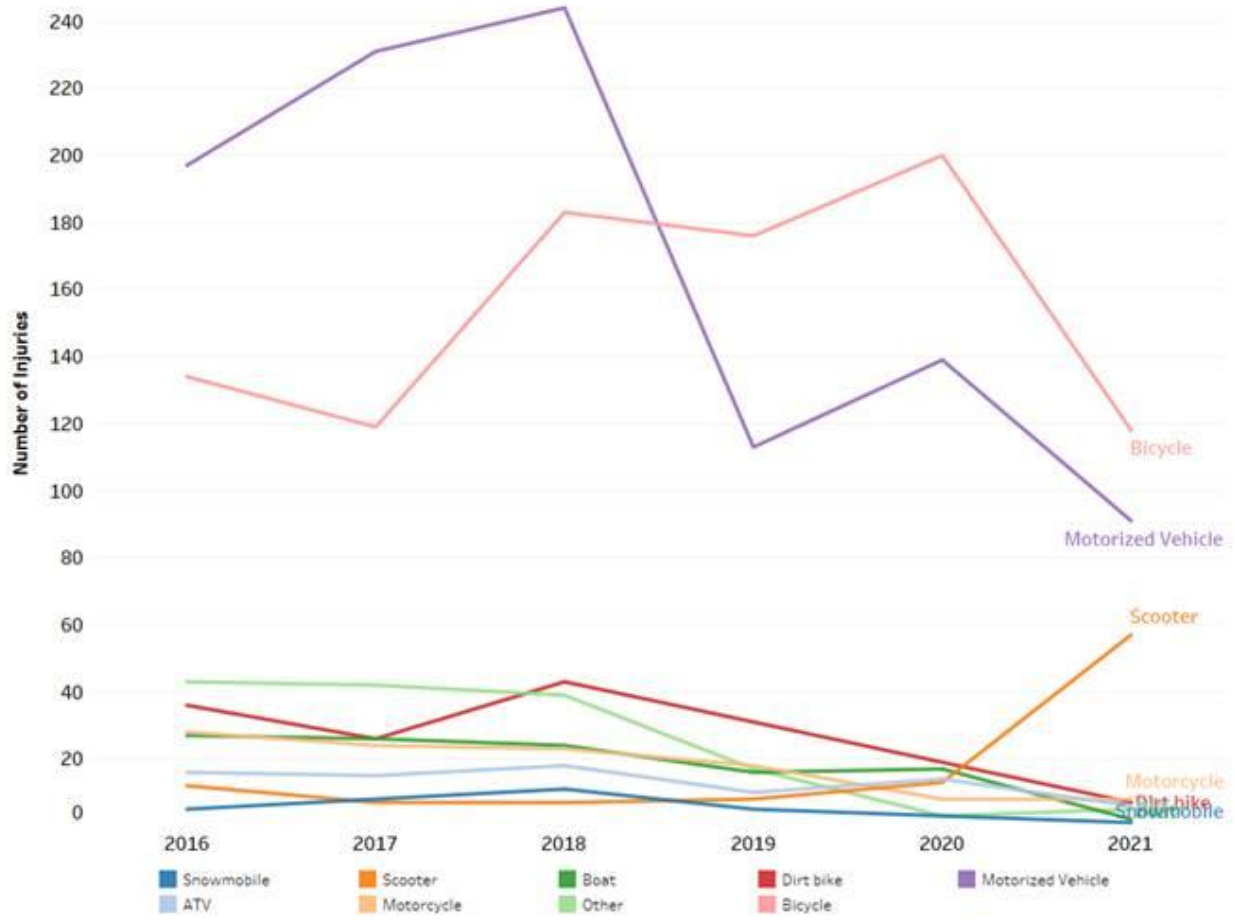
In order to compare the number of injuries related to e-scooter injuries after the launch of the pilot program, data from KGH emergency records relating to e-scooters was collected for a period of time prior to the program implementation, from April 2016 – December 2020. The number and type of injuries in this period was compared to that collected between April and August 2021. While the number of scooter-related injuries prior to 2021 represented 2% (average of 9 injuries per year) of all transport injuries, in 2021, this proportion increased to 19% (57 injuries) of all transport injuries. The sharp increase in scooter-related injuries in 2021 clearly coincides with the introduction of Kelowna's e-scooter program.

Figure 1.



*KGH ED: Kelowna General Hospital Emergency Department

Figure 2.
Transport related injuries registered at KGH ED between April, 2016 and Aug, 2021 in 16-64 year olds, by vehicle type and year



Please note that the above figures represent injuries seen at KGH ED department and do not represent the injury overview for the region. Also the data for 2021 is incomplete (Jan - August 2021), and may not represent the full picture of injuries in the year 2021 especially related to other vehicle types

3.3 Injury frequency

Since the introduction of the e-scooter program in Kelowna in April 2021, the KGH dataset shows:

a) 25 confirmed e-scooter related injuries per 100,000 trips

b) 12 e-scooter injuries per 100,000 kilometres traveled on an e-scooter.

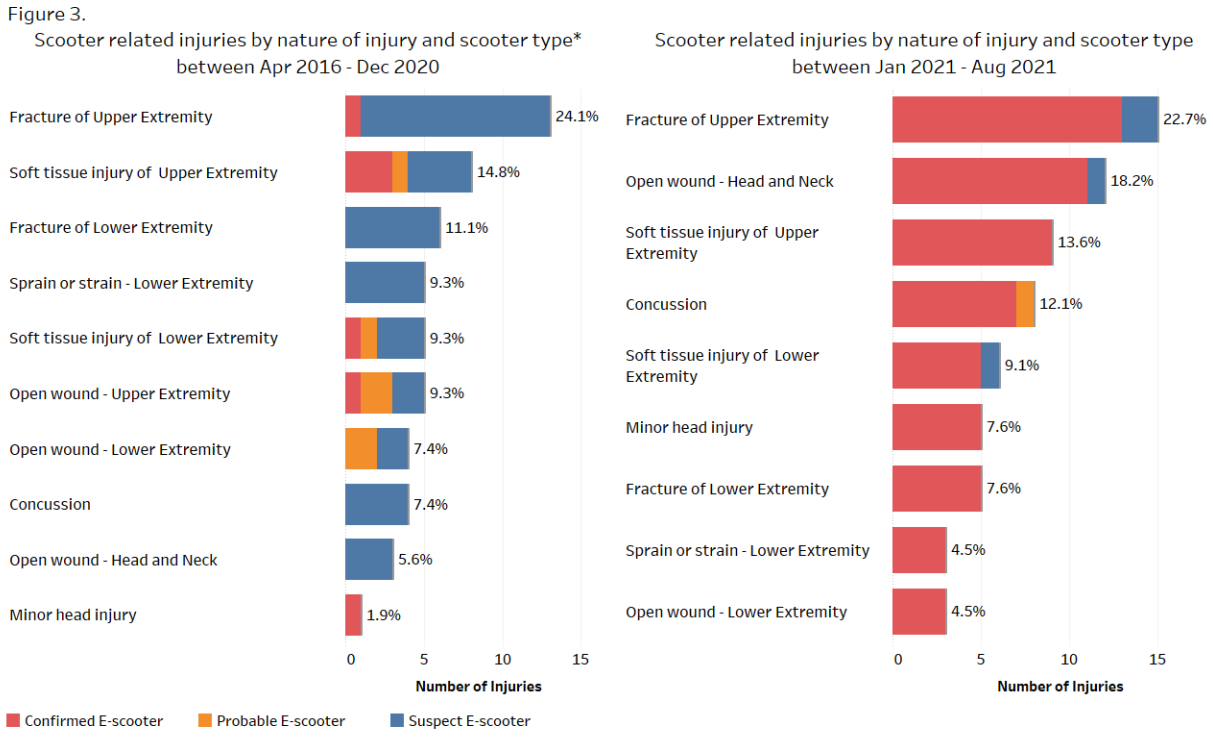
The findings related to injury frequency in Kelowna are similar to the findings of a study conducted by the Austin Public Health Department (APH) with assistance from the U.S. Centers for Disease Control and Prevention (US CDC), which shows that there were 20 injuries per 100,000 trips in Austin, Texas between September and November, 2018.

Injury data collected in Calgary from mid-July to mid-September, 2019 shows an injury rate of 95,400 per 100 million e-scooter rides. The injury rate in Calgary is nearly five times higher than that of Austin, and almost 600 times higher than taking the bus (The Star, October 2019).

3.4 Head injuries and helmet use

For both time periods – pre and post pilot launch - the most frequently reported scooter-related injury involved fracture of the upper extremity (23%). In the 2021 period, more scooter riders experienced head and neck related injuries (18% in 2021 vs. 6% prior to 2021) as well as concussion (12% in 2021 to 7% prior to 2021). These findings suggest that e-scooter injuries are more likely to result in head and neck related injuries, as well as concussions. KGH data also show that most scooter riders with related injuries did not wear helmets. More specifically, 97% of confirmed e-scooter riders did not wear helmets, and were more likely to sustain an open wound injury to the head and neck than other head/neck injuries.

Figure 3.



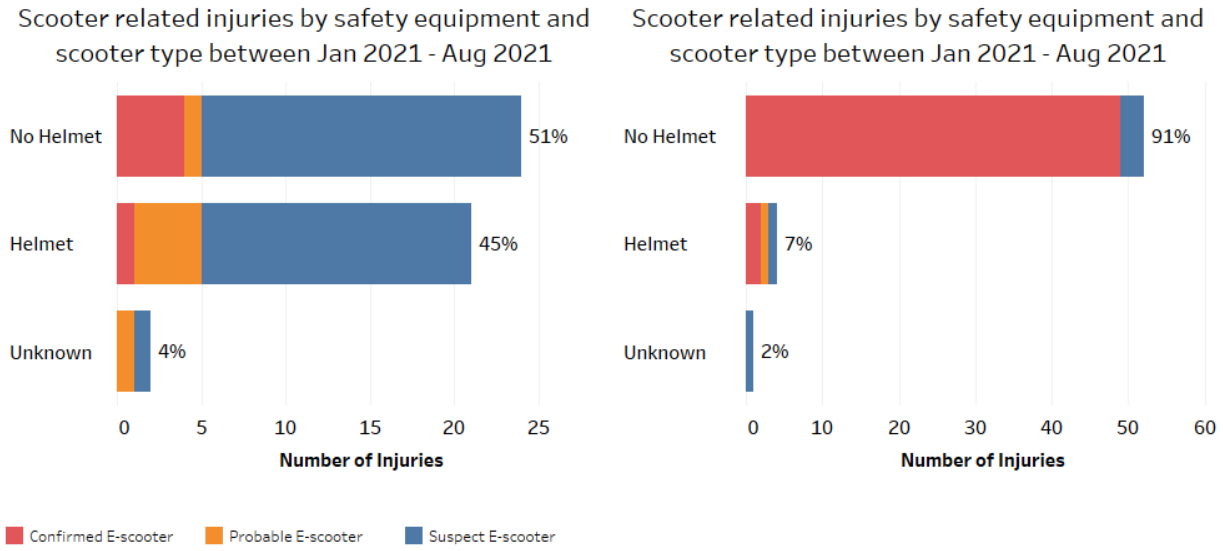
The head injury findings from KGH data are consistent with e-scooter injury data from other parts of the world. The APH study (see section 2.2 for study details) found that nearly half (48%) of 190 injured riders sustained head injuries, and 15% had a traumatic brain injury (Austin Public Health, 2019).

A Southern California study from September 2017 to August 2018 involving 249 injured patients found that head injuries (40.2 %) were among the most common injuries sustained as a result of e-scooter use. Moreover, in spite of being required to wear helmets while riding e-scooters according to California law, only 4.4% of injured riders were documented to be wearing a helmet (Trivedi et al. 2019).

Another study, which pulled data from a representative sample of Emergency Department encounters from approximately 100 hospitals in the United States from 2013 to 2017, found that head injuries were the most common, representing 27.6% of all injuries (Aizpuru et al., 2019).

Studying KGH e-scooter head injury data in conjunction with consistently high rates of head injuries and low rates of helmet use from the studies discussed above points towards an urgent need for stringent policies regarding helmet use for e-scooter riders.

Figure 4.



3.5 Cause of injury

The KGH dataset shows that the main cause of e-scooter related injury in both time periods was a fall on man made (93%) or environmental surfaces (4%). There were a very small proportion of cases in which injuries were caused by the scooter itself or another vehicle.

These findings are comparable with the findings from a Southern California study involving 249 injured patients (see section 2.3 for study details). In this study, the most common mechanisms of injury were fall (80.2%), collision with an object (11%), and being hit by a moving vehicle or object (8.8%) (Trivedi et al., 2019).

Furthermore, in a review of e-scooter evaluation studies from 14 European and American cities, Badia and Jenelius (2021) find consistently high rates of injuries due to falls.

The high rates of e-scooter injuries due to falls in Kelowna, as well as other cities in Europe and America, further strengthen the case for introducing stringent helmet use policies.

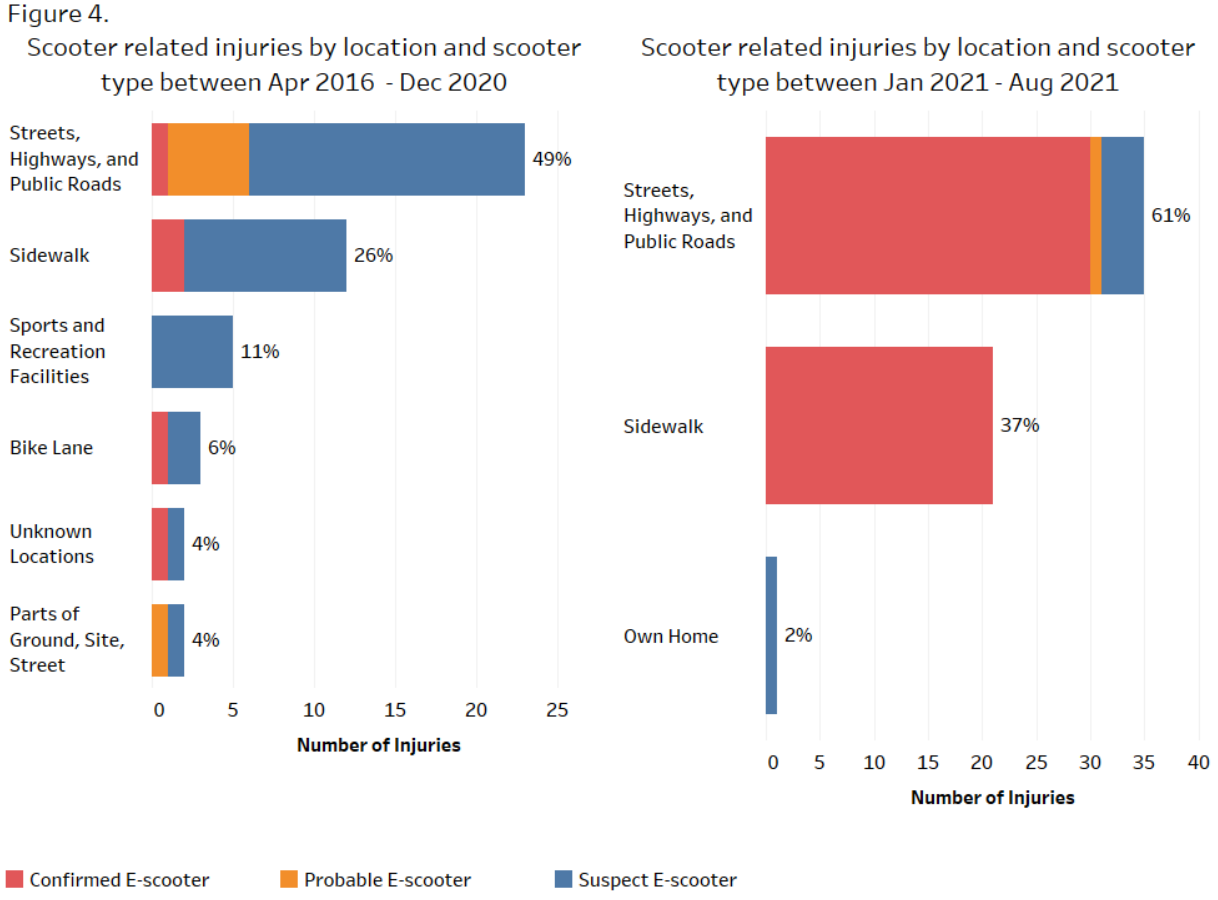
3.6 Location of injury

The KGH dataset shows that most of the confirmed e-scooter injuries in 2021 occurred on a street, highway, or public road (61%), followed by sidewalks (37%).

These findings are comparable with the results from the APH study, which found that more than half (55%) of injured riders were injured on the street, while 33% were injured on the sidewalk. Additionally, 16% of the accidents involved a motorized vehicle, and 17% involved a curb or inanimate object (Austin Public Health, 2019).

Similarly, Badia and Jenelius (2021) found sidewalks and traffic lanes to be the riskiest locations for e-scooter riders. Based on this finding, the authors argue that segregated infrastructure for e-scooters and other micromobility devices should be promoted to ensure the safety of riders.

Figure 4.



3.7 Alcohol and drug use

For both time periods in Kelowna, most scooter-related injuries did not seem to be associated with alcohol use. In the 2021 study period, however, there were 8% more scooter related injuries associated with alcohol use as compared to the study period prior to 2021 (12% vs. 4%). This preliminary finding indicates a rising trend in scooter-related injuries due to alcohol use, and points towards the need to monitor this trend in the future.

Alcohol use in relation to e-scooter injuries have been high in other parts of the world. For instance, Bekhit et al. (2020) reviewed e-scooter related injuries in the Auckland region between September 2018 and April 2019, and found that 26.8% of the injuries were associated with alcohol use. Similarly, the APH

study found that 29% of the interviewed riders reported drinking alcohol in the 12 hours preceding their injury.

A study of e-scooter injuries based on data collected from three Level 1 trauma centers in the U.S. shows that 48% of patients had a blood alcohol concentration > 80mg/dL. Furthermore, 60% of the 103 patients in the study were screened for drugs, and 52% of them tested positive. The most commonly found substances on urine toxicology were THC, followed by methamphetamines and amphetamines (Kobayashi et al., 2019).

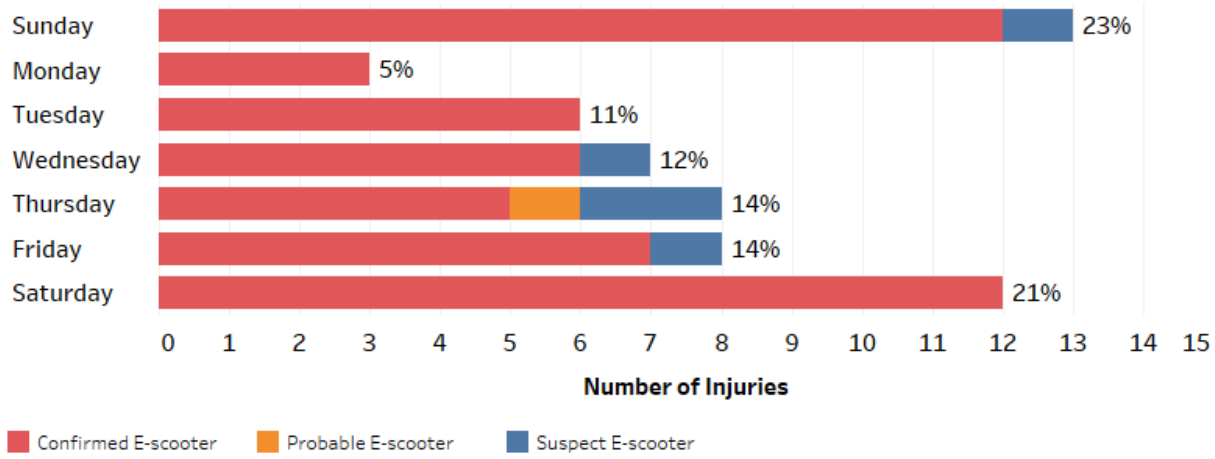
3.8 Time, Day of the Week, and Season

In Kelowna, scooter-related injuries were most likely to occur during weekends and in the afternoon hours between 12 and 6 pm. Furthermore, scooter-related injuries were most likely to occur outside the winter months, particularly during the period of July to September.

The weekend injury data from KGH is comparable with the findings of the APH study, which found that 39% of injured e-scooter riders were injured over the weekend: Saturday and Sunday. Aizpuru et al. (2019) also found that weekend injuries were more common than weekday injuries. Furthermore, in a review of multiple cities across Europe and America, Badia and Jenelius (2021) found that the demand for shared e-scooters is at its highest during weekends and during evenings on weekdays, which coincides with the time-periods during which leisure trips are most likely to occur.

The higher incidence of weekend injuries in Kelowna, as well as similar findings from other cities, indicates the need to implement lower speed limits and mandatory helmet use policies during the weekend.

Figure 5.
Scooter related injuries by day and scooter type between Jan 2021 - Aug 2021



3.9 Gender

There was a gendered shift in the incidence of scooter-related injuries for the two time periods in Kelowna: female representation increased from 45% before 2021 to 67% in 2021. The increase in female

injuries is particularly noteworthy because there were more male (58%) than female (42%) shared e-scooter riders registered according to the City of Kelowna's staff data collection efforts. Although females were more likely to suffer an e-scooter related injury in 2021, injured males were more likely to sustain severe injuries to the head and neck (40% vs. 36%), including open wound injury (27% vs 13%) and concussion (14% vs 10%). Moreover, males were also more likely than females to sustain multiple injuries in the 2021 study period (47% vs 31% respectively).

Figure 6.

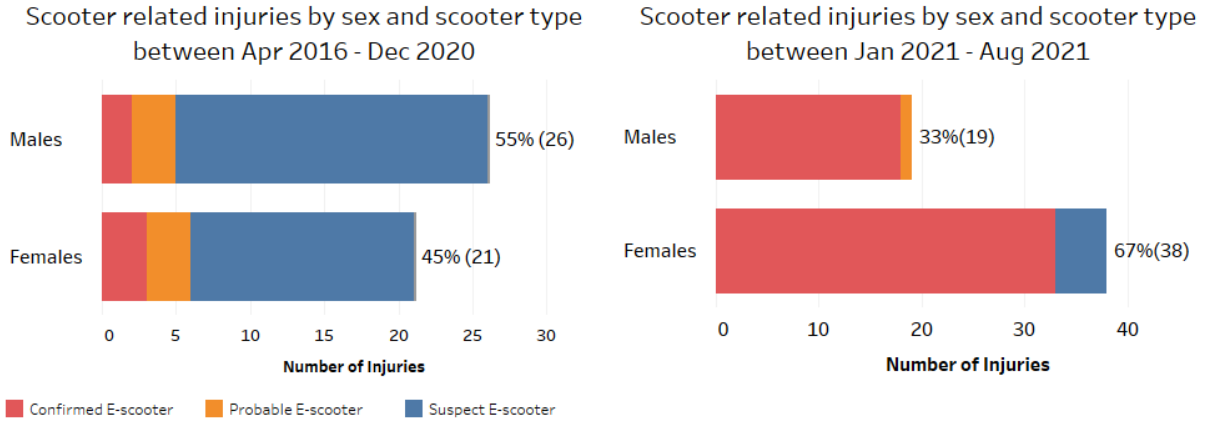
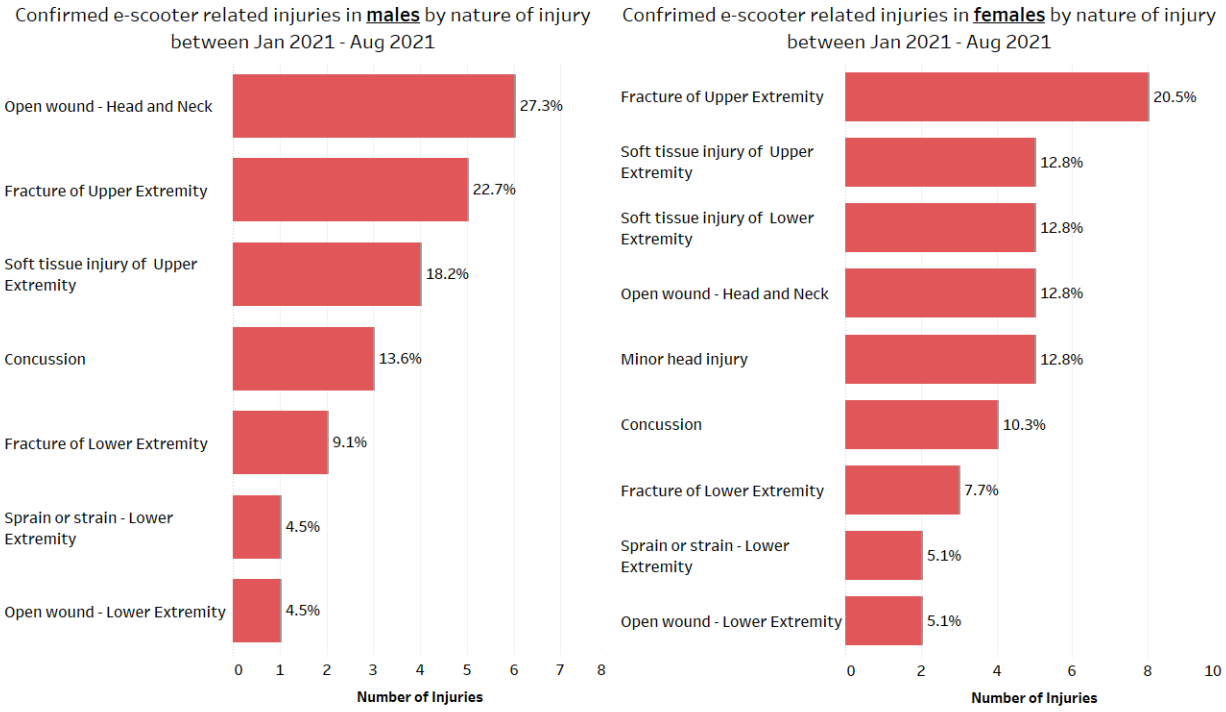


Figure 7.



The higher incidence of female injuries in Kelowna is interesting and worth monitoring in the future. Findings from numerous studies of e-scooter injuries in the U.S. consistently show that males are significantly more likely to sustain e-scooter related injuries. While the difference may be due to

different definition of "injuries" consider for example, the higher incidence of male injuries in the following studies:

a) Aizpuru et al. (2019) found that 60% of the total injured patients were male

b) In the APH study, 55% of the injured riders were male

c) Bresler et al. (2019) found that 62.1% of the patients were male

d) Trivedi et al. (2019) found that 58.2% of the patients were male

e) Kobayashi et al. (2019) found that 65% of the patients were male

The mismatch between gender-specific e-scooter injury data in Kelowna and U.S. cities indicates that gendered trends need to be monitored closely in the future. As well, e-scooter companies should consider introducing online training programs to raise awareness about safe e-scooter use among riders. For example, consider that the Swedish e-scooter company, VOI, has developed an app-based training program, and offers credits for future rides when users finish the training (International Transport Forum, 2020).

IV. Other Health Considerations – Emerging Data

E-scooters are a relatively new micro-mobility vehicle and research has primarily focused on injury associated with use. While the risk of injuries from e-scooter is clear, the possible benefits are controversial. New literature is emerging about other possible health risks associated with e-scooter use related to environmental and climate impacts and a possible reduction in physical activity rates. Literature reviews on the subject have researchers debating whether e-scooter use could contribute to decreased level of physical activity if e-scooters replace other modes of active transportation including cycling and walking (Bozzie & Aguilara, 2021; Sanders et al., 2020). Conversely, others are finding that infrastructure changes made to accommodate safer e-scooter riding may help to create environments and culture more conducive to cycling and walking (Glenn et al., 2020). Increased physical activity has positive affects on health outcomes, including healthy weights, lowered stress, and improved mental health.

Other emerging data suggests that while e-scooters produce less exhaust emission than personal vehicles, their environmental impact is greater than other modes of transportation like buses and e-bikes (Bozzie & Aguilara, 2021; Glenn et al., 2020). The production of e-scooters is noted as a rather polluting process and the lifespan of these vehicles is currently far below that of other vehicle types. Using a life-cycle assessment approach researchers suggest that e-scooters may have a more negative life cycle impact on the environment than other modes of transportation. The research notes that the average lifespan of a an e-scooter is about two years, resulting in increased garbage in landfills and the requirement of more frequent production of the vehicles, both contributing to increased CO_2 levels and global warming (Glenn et al., 2020). However, as above, e-scooters do offer a mode of transportation with far lower air pollution impacts than cars. Factoring in the number of trips taken by vehicle type is an important aspect to accurately calculating emissions and making comparisons across different modes of transportation. This area of research warrants further attention in order to fully understand the positive and negative environmental impact of e-scooters.

V. Policy/Program considerations

In order to mitigate e-scooter injuries, this section contains examples of e-scooter policies from other cities in Europe and the U.S., which can be taken into account while drafting specific policy recommendations for e-scooter use in Kelowna.

1. Speed regulation

- Focus on ways to reduce speed in high traffic areas
    - Slow zones have been implemented in areas with high pedestrian foot traffic in Auckland, New Zealand. For example, the maximum speed of e-scooters in Adelaide, Australia, is 15 km/hr.
- Consider charging by distance travelled, or per trip, or a monthly subscription.
    - The pay-per-minute method is an incentive for speeding. A time-based pricing system also incentivizes dangerous behavior, such as making dangerous manoeuvres, running red lights, and not yielding to pedestrians.
- Consider using geofencing to regulate speed in high-risk zones.
    - Geofencing refers to the creation of a virtual perimeter (using smartphones or other devices) for a real-world geographic area. This method of speed regulation has been used in Santa Monica in the U.S., and in the French cities of Lyon and Paris (International Transport Forum, 2020).

2. Helmet use

- Consider mandating and enforcing helmet use on e-scooters travelling at high speeds, and in high-traffic zones.
- E-scooter companies can promote the use of helmets through positive messaging and incentives.
- Consider providing helmets that are attached to the e-scooters.

3. E-scooter design

- Consider mandating changes to improve the visibility of e-scooters, such as bells, horns, lights, reflectors, and turn indicators.

4. Infrastructure Changes

- Consider building more segregated road infrastructure for active transportation vehicles to reduce the likelihood of collisions between e-scooters and vehicles and pedestrians. The cost of building infrastructure can be retrieved from e-scooter companies: the City of Indianapolis has imposed an up-front fee of $15,000 on e-scooter operators plus $1 per day, per scooter to pay for infrastructure and enforcement (IndyStar, January 2019).

5. Education and Awareness

- We suggest collecting data on injuries associated with inexperienced vs more experienced riders to help inform educational efforts in Kelowna.
    - The APH study found that a third of the 125 interviewed riders were injured during their first e-scooter ride, and over 60% of injured riders had made fewer than 9 trips on an e-scooter. This finding correlates with the higher number and severity of injuries in Kelowna soon after the program was implemented.
- Consider using a variety of methods to spread educational messages on safe e-scooter riding practices, appealing to all genders, and increase the frequency of such messages. Such messages should especially target riders in the 20-39 years age group, since the majority (45%) of scooter related injuries in Kelowna occurred in this age group in 2021.
- Include awareness and safety training regarding e-scooters in the knowledge and road tests for driver licensing.

6. Enforcement and Incentives

- Implement measures to reduce intoxicated e-scooter riding
- Provide additional resources to enforce policies for riding while intoxicated

V. Areas of Future Study

While emerging literature on the indirect health impacts of e-scooter use is currently limited and inconclusive, articles reviewed for this project suggest that looking beyond the direct health impacts of e-scooter use is important to better understanding the overall health impacts associated with this micro-mobility vehicle.

- Explore the impacts of e-scooter use on physical activity rates
- Explore climate and environmental impacts of increased e-scooter usage

Sincere thanks to Dr. Curtis May for compilation of the literature review that informed the basis of this document.

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Appendix A

Data Notes

- **Data source**:
  - ✓ City of Kelowna e-scooter pilot program database was used to obtain the number and length of trips as well as demographic stratification.
    Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP) database based at Kelowna General Hospital, Kelowna. CHIRPP is a surveillance system initiated by Public Health Agency of Canada that collects injury data from emergency department across the country. Currently there are 20 participating sites including the KGH emergency department. The KGH CHIRPP team performs chart reviews and when possible patient interviews to collect relevant information on injuries.
    The CHIRPP data was provided for the period of April 2016 to August 2021
  - ✓ Please note that data **collection for the month of August was not complete** at the time this analysis was performed.
  - ✓ **IMPORTANT NOTE**: Patient registration at KGH ED began to focus on **recording the type** of scooter, specifically e-scooters, in June, 2021. An e-scooter flag was added to the emergency registration system at this time. Prior to this date the type of scooter involved in an injury was not regularly or discernibly recorded. Although this should not affect the numbers of all scooter related injuries, the number of **electric** scooter related injuries specifically will be underestimated prior to 2021.
- **Definitions**:
  - ✓ **Confirmed e-scooter**: Has the terms "e/electronic/e" + "scooter" in the injury event description field
  - ✓ **Probable e-scooter**: Has the expression "motorized scooter" but not terms "Vespa", "moped" or "mobility" in the injury event description field AND excludes those cases categorized as confirmed
  - ✓ **Suspect e-scooter**: Has the term "scooter" but not the terms "push" or "pedal" in the injury event description field AND excludes those cases categorized as confirmed or probable
  - ✓ **Rates**
    - Injury rate based on the number of e-scooter trips. Expressed as the number of injuries sustained for every 100, 000 e-scooter trips taken/e-scooters rented (=Total number of injuries/total number of trips by e-scooters)
    - Injury rates based on the distance traveled. This can be expressed as
      1. Number of injuries per kilometre traveled by an e-scooter (=Total number of injuries/total number of kilometers traveled)

      OR
      2. Number of kilometres traveled by e-scooters before an injury is sustained by a rider (=Total number of kilometers traveled/ total number of injuries)

- **Important Dates**:
  - ✓ E-scooter sharing program in Kelowna was initiated on April 19, 2021
  - ✓ E-scooter focused data collection at the KGH emergency department commenced in June 03, 2021
    Note that this gap will underestimate the total number of e-scooter injuries captured by the KGH emergency department and as such CHIRPP as well.
- **Periods of analysis**:
  - ✓ As the e-scooter sharing program started in April 2021 and assuming that riding of scooters doesn't normally occur during winter months, the analysis focuses on the following time periods:
    - ➢ April 2016 – Dec 2020 (Pre 2021 period)
    - ➢ January 2021 – August 2021 (2021 period)
- **The following exclusions were made in the analysis of the CHIRPP data**
  - ✓ **Age groups**
    - ▪ Please note that the term "e/electronic/ e-"+"scooter" can sometimes be used to describe a mobility scooter used by the elderly. **As such, injuries occurring in the age group of 65 or older were excluded**.
    - ▪ The Kelowna e-scooter sharing program safety rules stipulate the use of e-scooter for those 16 and over, hence injuries occurring in **those younger than 16 years of age were excluded**.
  - ✓ **Urban vs rural injuries –** As the CHIRPP data could not provide information on scooter ownership (private vs shared program), the analysis **excluded injuries marked as having occurred in a rural setting**. This provided a higher likelihood that any e-scooter related to an injury was potentially part of the e-scooter sharing program. Please note that this is an assumption and is a limitation in this analysis.
  - ✓ **Organized Sports Activities –** To further narrow down on scooter use for transport purposes, **scooter related injuries that were part of an organized sport activity were excluded**.

- **CHIRPP Data limitations**
  - ✓ **Exclusivity of the term e-scooter**:
    As the term "e/electronic/ e-" + "scooter" can sometimes be used to describe a mobility scooter used by the elderly, injuries occurring in the **age group of 65 or older were excluded** although they could be potential users of electric scooters as described in this report. Also, younger individuals that may have been using a mobility scooter, would be counted as actual electric scooter users, as described in this report.
  - ✓ **Data missing on type of scooter involved in an injury**:
    Prior to 2021 the type of scooter involved in an injury was not regularly or discernibly recorded as such the analysis looked at all scooter injuries, while attempting to differentiate among scooters using any available descriptions in the injury event notes. To aid the analysis, e-scooters were categorized into confirmed, probable and suspect

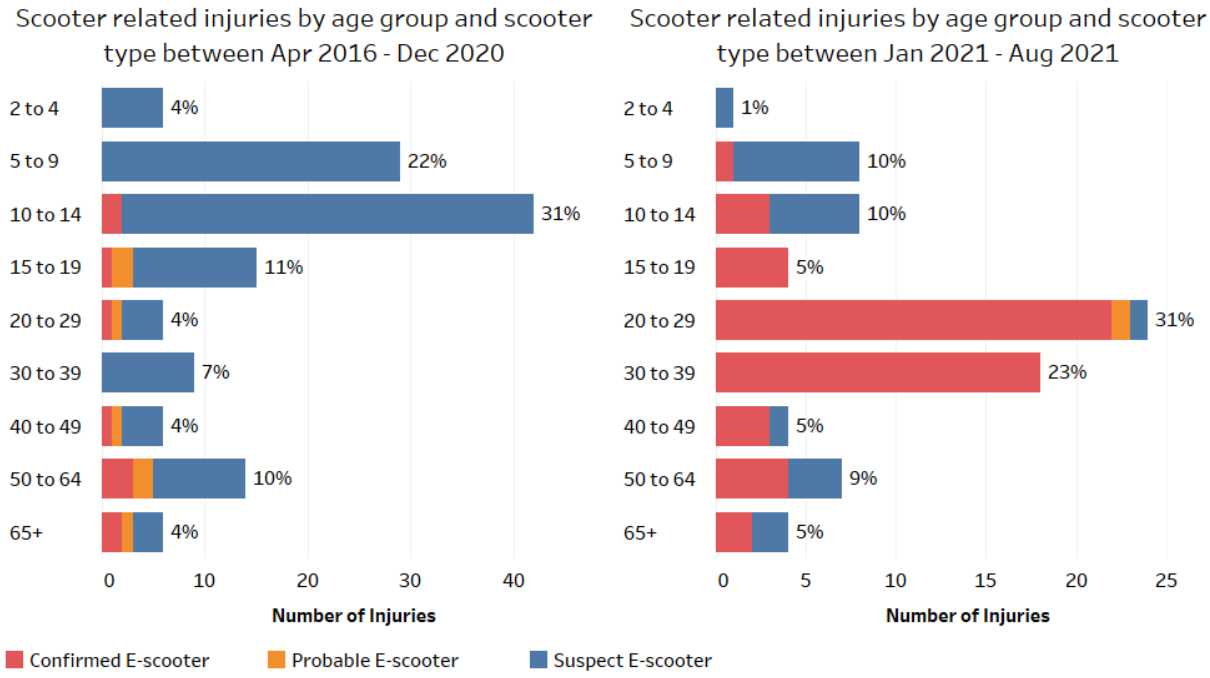
(please see definitions in the data notes above). Although this will provide useful information on scooter injuries, it will not provide an accurate picture of e-scooter injuries.

- ✓ **Pandemic restrictions affected data collection**:
  Prior to 2020 CHIRPP employed volunteers to assist in interviewing patients that present to the emergency department with injuries therefor enabling more robust data collection(in depth descriptions of the injury event). Due to the safety restrictions implemented during the COVID pandemic, volunteers were unable to continue with this practice.
- ✓ **Exact location of injury was not available**. The field categorizing injuries as urban or rural was used to identify those injuries occurring in an urban setting, in order to narrow down on injuries potentially linked to the City of Kelowna e-scooter pilot program. The urban flag however is not limited to downtown Kelowna, where the e-scooter sharing programs were implemented.
- ✓ Information on whether a scooter driver was a **first time user was not available**
- ✓ **Information on scooter ownership** i.e. private versus shared scooter was **not available**

Appendix B

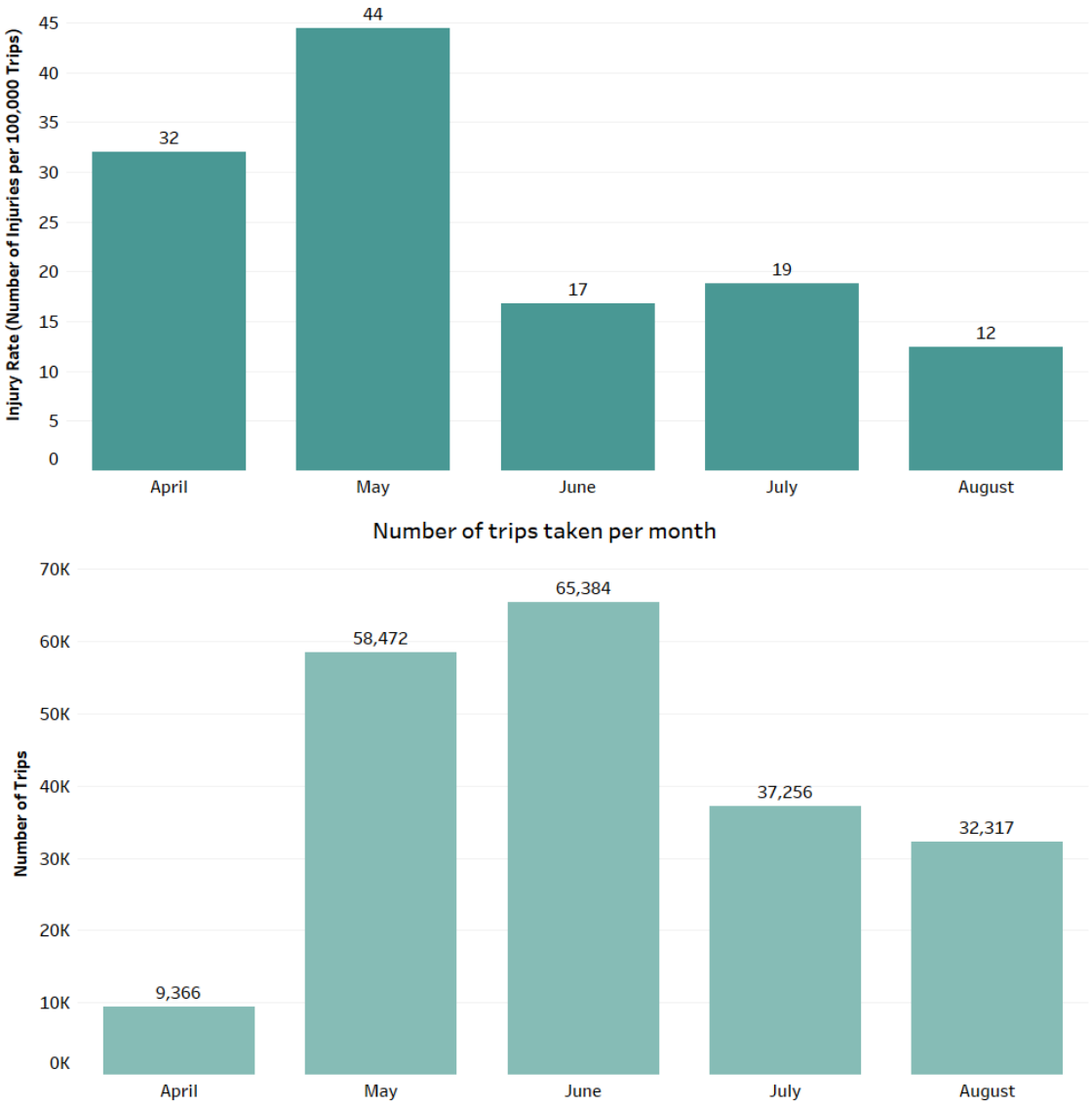
Additional Figures

Figure 1.



Comparing scooter injuries prior to 2021 and in the 2021 period, injury incidence shifted from younger age groups, 5-14 year olds to 20-39 year olds, reflecting a new trend of scooter use. The latter correlates with the age groups of riders registered with the City of Kelowna's e-scooter program.

Figure 2.
Trip based injury rates (number of confirmed e-scooter related injuries per 100,000 trips), by month



As per the City of Kelowna's data, the number of injuries per 100,000 trips declined after a peak in May although the number of trips was higher in the month of June. The rate of injury remained stable between July and August, although the number of trips reduced almost by 50% (~65,000 to 36,000) during the month of July and August.

Please note that in the above, we assume that all e-scooter related injuries captured at KGH ED occurred while using the City's e-scooter program and all those injured did seek care. These assumptions cannot be currently confirmed and it is very unlikely that all those who were injured did seek care and if they did that they accessed the KGH ED.