

# Is Your Bike Safe in Toronto?

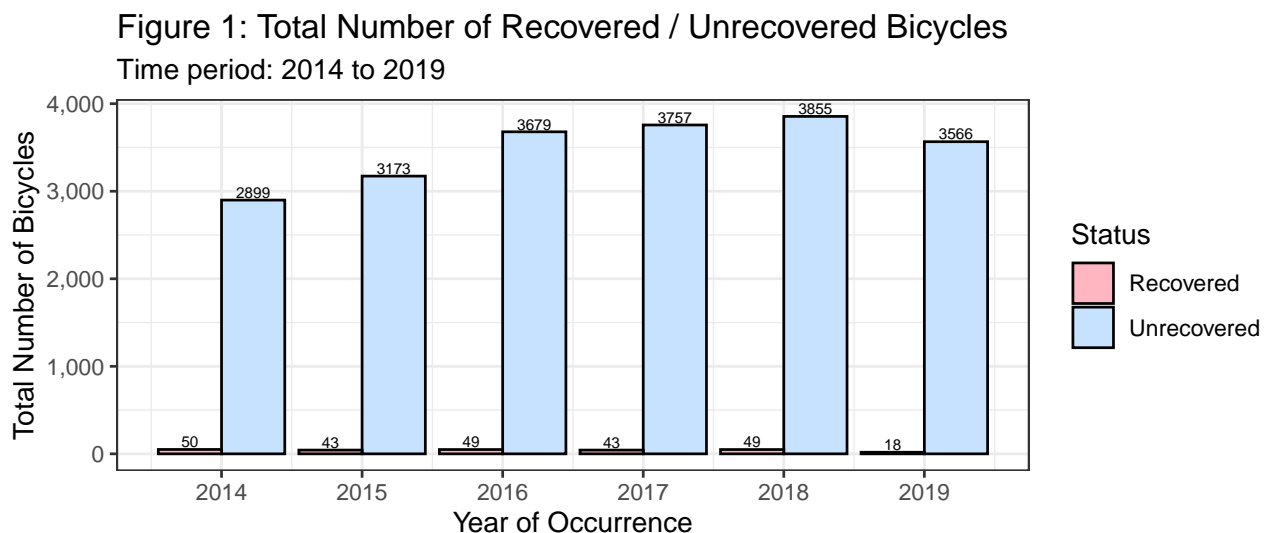
Yesol (Emily) Yi, Yufei (Stella) Zhao

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Walk down any busy downtown street in Toronto; you will be able to spot bicycle frames missing various parts, from wheels to seats, even handlebars. For many Torontonians, a bicycle is their primary form of transportation. However, many bicycle owners have experienced or heard about bicycles being stolen or rendered useless. Owners invest in bigger, tougher locks and sometimes take easier stolen parts such as seats inside when they are at their destination. However, is this sentiment true? Are Torontonians being extra cautious because there is a high number of bicycle thefts in Toronto or is it just a result of so many of us hearing about these bicycle thieves? Moreover, does the location, the time or even the type of bicycle affect the probability of getting one's bicycle stolen? With this information, one can aim to safely cycle around the streets of Toronto.

## Are bicycles actually getting stolen?

No one likes their property being stolen, much less a high price, high value item like a bicycle and keeping their bicycle safe is number one priority for many cyclists in Toronto. However, sometimes people slip and think, "I am not going to be away from my bicycle for long; do I need to lock it up?" To answer if this question is valid, we need to look at if bicycle theft is a big enough problem.

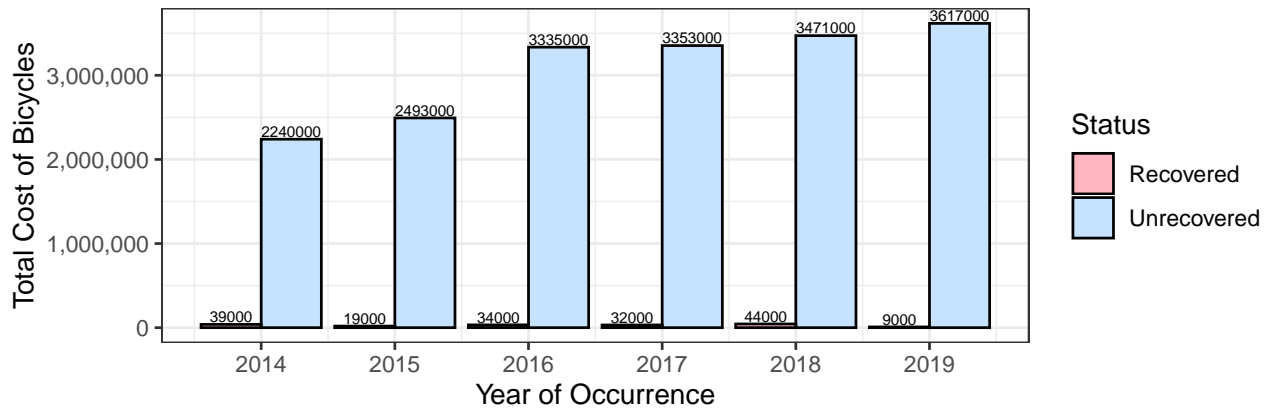


Everyone has heard of how their friends' bicycles were stolen or even their own bicycles were stolen in the past. However, no one knows exactly how many bicycles are being stolen around them. **Figure 1** tells us an alarming statistic. Over the 5 year period from 2014 to 2019, 21181 bikes were reported as stolen, which is approximately 12 bicycles stolen per day. Again, *12 bicycles are stolen per day*, not to mention bikes that were stolen but were not reported by their owners per day. Also bicycle theft has increased steadily over this period as well. This alone may be enough to cause some risk averse cyclists to worry if their bicycle is next. To add on to their problem, **Figure 1** also shows us that around 98.8% bicycles are not recovered when stolen. So, if your bicycle is stolen, do not count on getting it back because it probably is never coming back.

## How much are we losing?

Figure 2: Total Cost Involved in Bicycle Theft Events for Different Status of Bikes

Time period: 2014 to 2019



To emphasize how much bicycles are stolen, **Figure 2** shows us that cost wise, about \$18.7 million worth of bicycles were stolen. As a bike owner myself, by just hearing these figures I would never dream about putting my bicycle out of my sight. So let us imagine that this happened to me. I have my bicycle stolen and report it to the police. With this amount of bicycle thefts occurring throughout Toronto, you would hope that the Toronto police will have a grasp on how they catch bicycle thieves right?

The two figures shown below provide a more detailed look into the trends of bicycle theft in Toronto. **Figure 2.1** shows a positive relationship between the total cost of bicycle theft and the number of bicycles being stolen increases. However, **figure 2.2** shows that the total cost of bicycles recovered fluctuates year by year. This may be representative of the fact that the ability to recover stolen bicycles did not increase even though the amount of bicycles that are stolen increased over this time period.

Figure 2.1: Total Cost Involved in Bicycle Theft Events for Unrecovered Bikes

Time period: 2014 to 2019

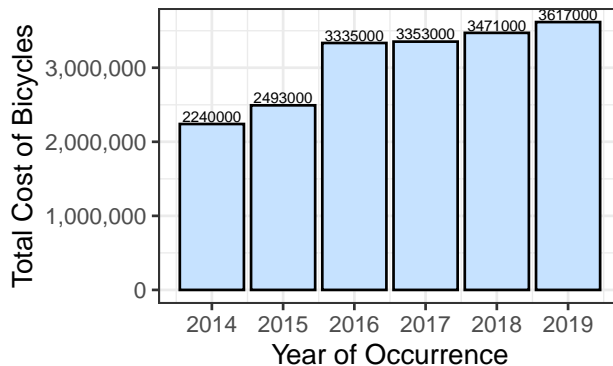
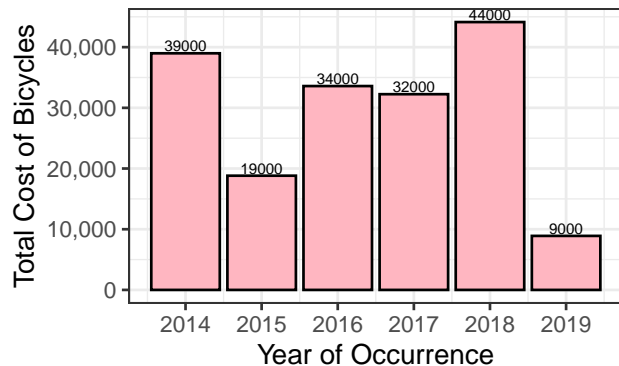


Figure 2.2: Total Cost Involved in Bicycle Theft Events for Recovered Bikes

Time period: 2014 to 2019



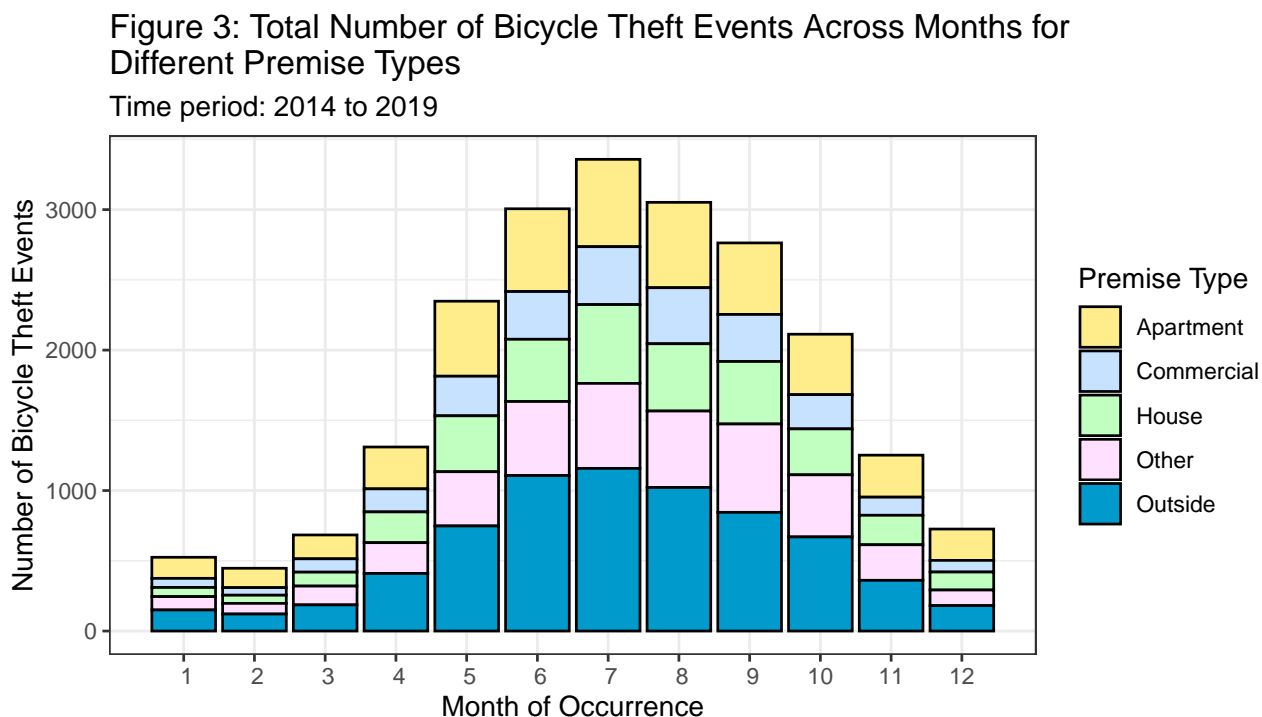
**Figure 2.1** and **Figure 2.2** is a closer look at how many bicycles are stolen per year over the same period of time, from 2014 to 2019. As we approach nearly \$3.5 million worth of bicycles being

stolen every year as shown in **Figure 2.1**, Toronto Police will be able to catch more bicycle thieves every year, no matter how small that amount may be, right? The answer is no. Their ability to recover bikes did not increase over the years. We again have our hopes dashed as **Figure 2.2** shows us that the amount of recovered bicycles are random every year. There is no specific guarantee that I will be able to get my stolen bicycle back with some probability and that is frustrating to no end.

It is now clear that there is a bicycle theft epidemic in Toronto and there is a low chance of recovering stolen bicycles. However, unless there is such a thing like a bicycle stealing hotspot where all of these thefts occur, where do these bicycle thefts occur? Where do bicycle thieves prowl around to see easy targets and part us with our precious bicycles?

## Where are our bicycles being stolen?

Torontonians are in a precarious situation where they fully understand their bikes are at risk of being stolen but must still bring their bicycles out. So, in order to reduce this unfortunate risk, we must dive deeper into the information and create a strategy.



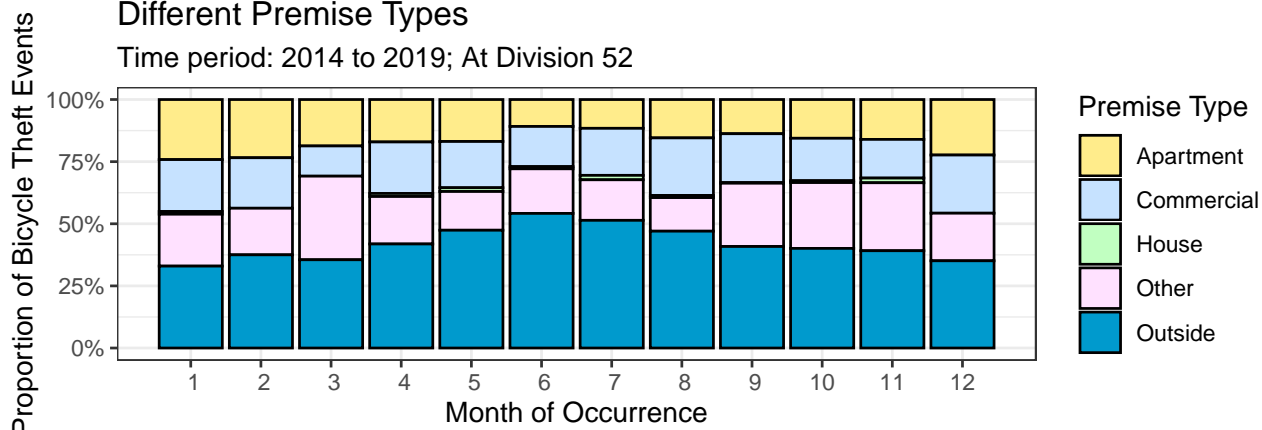
**Figure 3** lets us know that as the weather gets nicer approaching June and July, the number of thefts increase. Understandably, it is more convenient and nicer to ride bicycles and the more bicycles there are, the higher the number of them being stolen. Now, the conclusion cannot end with me telling cyclists to not ride their bikes during the best months of the year just because there are more bicycle theft events occurring. So what should our strategy be to reduce our risk of theft?

In any situation, cyclists of Toronto have multiple options where they can park their bicycles in any given situation. They vary in security and convenience levels and depending on the location, may affect how easy it is for your bicycle to be stolen. **Figure 3** shows us that bicycles are stolen in every type of premises. Does that mean your bike is not safe anywhere you leave it? A closer

look at the data tells you a better story. For every month of the year, nearly half of the thefts occur when bicycles are left outside. Moreover, the proportions of where bicycles are stolen stay relatively similar throughout the year. This means that the easiest way to reduce your chance of someone running off with your bicycle is to not leave it outside whenever you can.

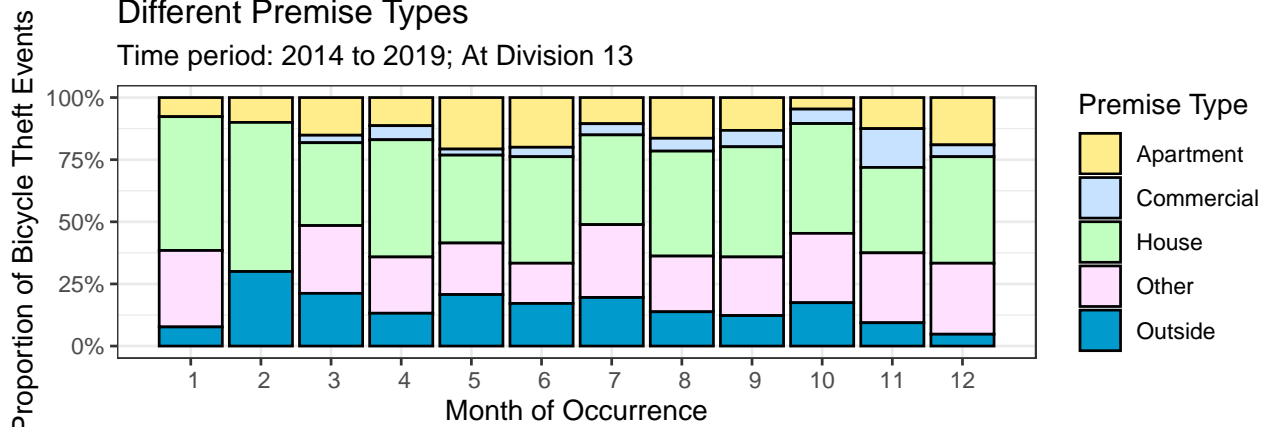
**Figure 3.1: Proportion of Bicycle Theft Events Across Months for Different Premise Types**

Time period: 2014 to 2019; At Division 52



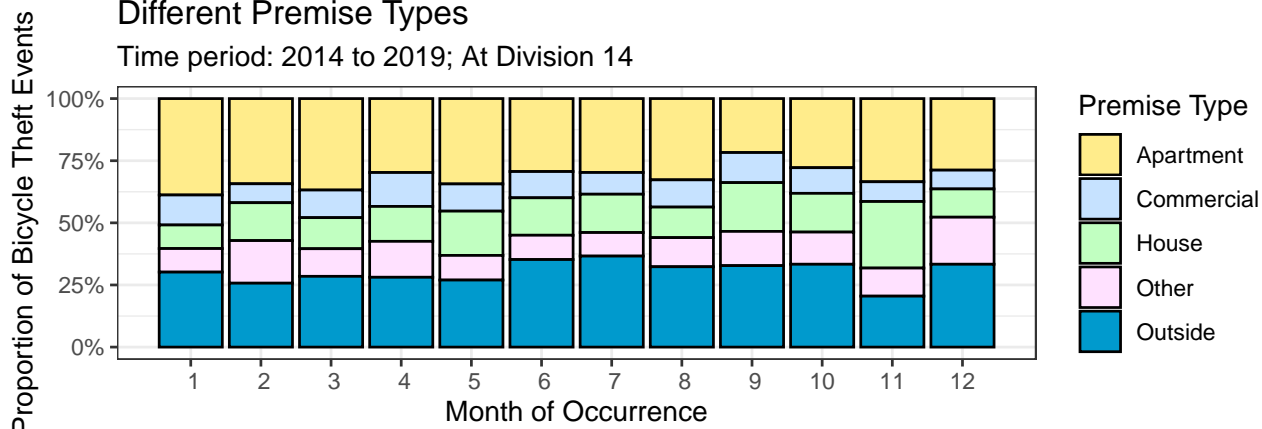
**Figure 3.2: Proportion of Bicycle Theft Events Across Months for Different Premise Types**

Time period: 2014 to 2019; At Division 13



**Figure 3.3: Proportion of Bicycle Theft Events Across Months for Different Premise Types**

Time period: 2014 to 2019; At Division 14



However, is this the same story for all Torontonians? Not leaving it outside is feasible when there

is space to park bicycles inside, but not everyone has that kind of luxury everywhere. Perhaps it is more efficient to find out where to park to have the least risk of your bicycle getting stolen.

The City of Toronto is divided into different divisions by the Toronto Police Department and we found representative divisions that can help us see what to look out for to keep our bicycles safe. **Figure 3.1** is a graph of Division 52, the area running down University Street from Bloor Street to the Harbourfront area (Toronto Police Service, 2022). With high rise commercial buildings and nowhere to park your bicycle inside, the highest chance of theft occurs when bicycles are left outside.

Remember, our goal is to find what to look out for to reduce the risk of getting our bicycles stolen. Even though Division 52 follows the same story as the large picture shown in **Figure 3**, not all of Toronto is built the same. **Figure 3.2** shows us Division 13 which is the midtown area with Eglinton Street running through the middle of it (Toronto Police Service, 2022). Almost opposite of Division 52 in building type, it is made up of mostly residential, smaller houses where a private garage may not be included. In this division, the highest chance of thefts happen when bicycles are parked in and near houses. Now, if you keep on your bicycle near your residence, you should be able to feel safe that no one is brave enough to come into your property and steal your bicycle. However, the data tells us otherwise. It is an unfortunate truth, but it is better to be safe than sorry and perhaps more security is needed for your bicycle even inside your house.

However, not all Torontonians live in houses or high rise commercial buildings. Right underneath Division 13 lies Division 14, the area from Bloor Street West to King Street West, ending underneath it at the Harbourfront (Toronto Police Service, 2022). **Figure 3.3** shows us that in Division 14, the most thefts occur when bicycles are parked in apartments. This is again, representative of the residential type that is most prevalent within this area.

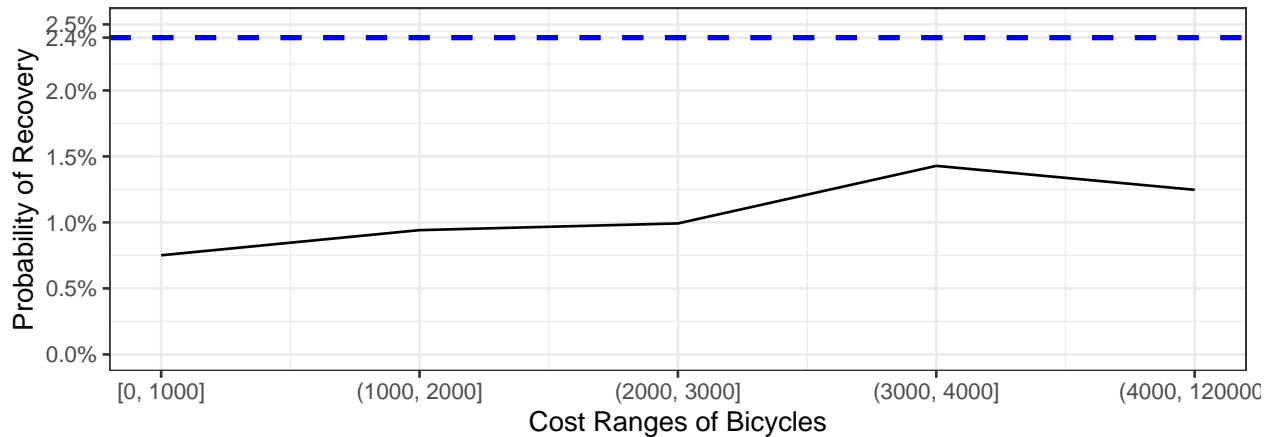
Now, a simple strategy can be made with this data. Unless you are the type of person to bike around the entire City of Toronto for some reason, the areas you frequently visit will be similar following your day to day activities. By keeping an eye out for what residential types are prevalent in that area and by either avoiding parking your bicycles in that area or having extra security if it is needed, you can thwart many attempts on the safety of your bicycle and not ruin your entire day as it ends with your bicycle going missing.

## How do I stop my bicycle from being stolen?

Let us take this time to recap what we know now. It is now understood that there are a high number of bicycle thefts occurring every day. Moreover, these thefts can potentially happen anywhere, with the highest number of thefts occurring when bicycles are left outside, depending on what the primary premise type of the area is. So back to the original question: is your bicycle safe in Toronto? The answer to that question is yes and no at the same time. Realistically, with the hundreds even thousands of cyclists that are active daily in Toronto, as long as you are not included in those 12 bicycles stolen daily, there is a low chance of your bicycle getting stolen. However, there is always a chance that you might be the unlucky one on a specific day and the best thing to do is to create a strategy to lower your chance of losing your bike.

Figure 4: Probability of Recovery for Bicycles at Different Cost Ranges

Time period: 2014 to 2019; Blue Line: National Average Probability of Bike Recovery



Now, we know that by taking a look at the surroundings of where you park your bicycle and having more security if you are leaving it at a high risk location, the risk of your bicycle being stolen can be reduced. **Figure 4** gives us another method of reducing that risk. For the Toronto area, no matter what cost range your bike belongs to, the recovery rate is well below the national average bike recovery rate of 2.4%, which is represented by the blue dashed line. Understandably, the chance of recovery even when the theft is reported is very low. However, the percentage of recovery increases significantly as the price of the bicycle that was stolen is higher. I understand that not everyone can afford \$3000 plus bicycles to maximize their recovery probability. However, if we understand the characteristics of expensive bicycles, we can apply that same theory to our own bicycles. More expensive bicycles are made using parts that are rarer and easier to recognize. Also, it is more difficult to sell these stolen bicycles as thieves will still try to get their money's worth with a more expensive bicycle. By giving your bicycles a very recognizable detail that is very difficult to remove, such as a paint job or a modification, you can give the police force or anyone helping you to find your bike a very distinct detail to look for. In addition, for expensive bikes, since the amount of money involved in a theft event is high, this will bring the police more attention in finding the bike back, which may be another cause of higher recovery rate for expensive bikes.

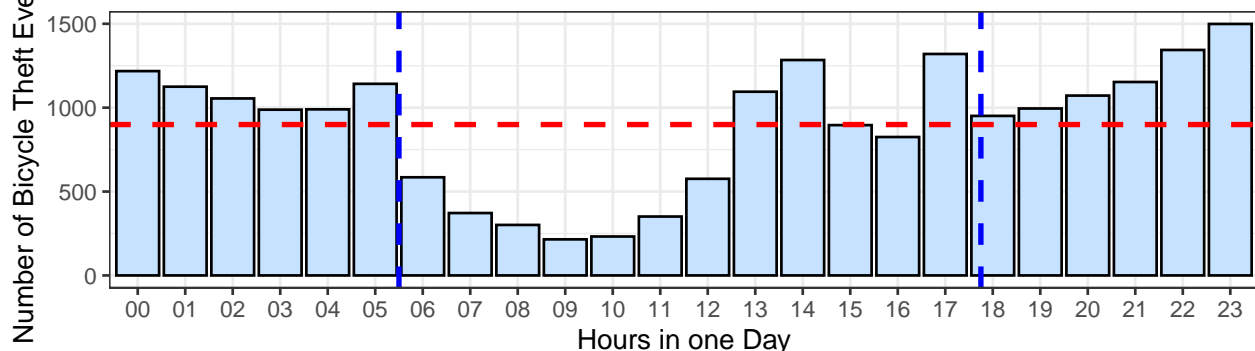
Figure 5: Number of Bicycle Theft Events During Different Hours in One Day

Time period: 2014 to 2019;

Left Blue Line: Average Sunrise Time for Toronto;

Right Blue Line: Average Sunset Time for Toronto;

Red Line: Average Number of Bicycle Theft Events in One Day



Again, I am not telling you to buy expensive bicycles just to reduce your chance of theft. To add on another strategy for your bike's safety, **Figure 5** shows that the number of thefts increase as the day becomes darker, peaking at 11:00 pm. This could be due to there being less people on the street near midnight so that it creates a convenient stealing environment for thieves. The chance of theft is lowest near sunrise and in the morning, which allows us to create another part to our strategy. As a person, there cannot be a constant amount of effort exercised throughout the day, every day. However, by exerting more focus and putting more security near the peak of illegal behavior, you can deter thieves by showing that it is difficult to steal your bicycle. By following the data that we have, you can give yourself a better chance of not losing your bicycle and enjoying your time with your property.

## **Should I trust all of this?**

Understandably, you should have questions of your own. Not all data is complete and tells the entirety of the story at 100 percent accuracy. We realize that this data encompass the 5 year period from 2014 to 2019 and 3 years have gone by since this data was gathered. Our analysis may not represent the newest trends and with the effects of a world wide event such as Covid-19, may not take into consideration how people's activities have changed during the pandemic. To increase the accuracy of our research, the best remedy will be to find the most recent data and add on to the already existing research. This will allow us to find new patterns if they exist and strengthen our strategy to reduce bicycle theft as much as possible.

Moreover, our data only takes into account thefts which were reported to the Toronto Police Force meaning that there may be thefts not reported. In a perfect setting, we might have access to all bicycle thefts happening in Toronto and a different conclusion may be more accurate. However, in this situation, survivorship bias is at play and we have to work with the data that we have access to. Let us be honest, how many people actually report their bicycle being stolen fully knowing that it is probably already long gone? Even though it may seem futile to report these thefts, it has to be understood that this is a big problem faced by many cyclists in Toronto. Rather than just treating it like one bad event that is already in the past, by reporting as much detail as possible, there will be more data that can allow us to find the most accurate and strong strategy to reduce the number of bike thefts in Toronto. Moreover, bicycle stores can help by surveying customers so that there can be more ongoing data to further strengthen the accuracy of the data.

## **So what should I do?**

In any situation, there is no 100 percent guarantee plan to not have your bicycle stolen. However, any precaution you take can reduce this chance of theft as low as possible to a point where you can feel relatively safe. Let us review our strategy. First, you should understand that there are thieves out to steal your bicycle and having sufficient strategy, in both sturdy, durable locks and devices that allow you to know the location of your bicycle which is becoming easier with technological advancements. Second, know the area that you are parking your bicycle and avoid areas that are high risk. Third, add some unmistakable details and put some effort into the bicycle so that it is easier to recognize if it does get stolen. Finally, put extra focus when leaving your bicycle out of your sight when it is darker outside, specifically as it approaches midnight. Again, even though it will not ensure safety, it does allow one thing. You will be able to more confidently answer yes to the question of "Is my bike safe in Toronto".

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