

# Getting Hitched: Torontonians Prefer to Get Married During Warm Weather\*

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2024-01-25

We examine marriage licenses obtained in the city of Toronto in the year 2022 and 2023 by months. By dividing the year into warm months (April, May, June, July, August, September) and cold months (October, November, December, January, February, March), the number of marriage licenses obtained in Toronto increase significantly during warm months, supporting the hypothesis that Torontonians prefer to get married during warm weather.

## 1 Introduction

According to Pantazi (2017), summer is the hottest time to get married due to more dress options, the opportunity to have an outdoor wedding, and relatively easier travel among other reasons, but is this actually true in Toronto? Toronto is a city known for cold weather in the winter with snow from October to March (Gough et al. (2014)). This means that we expect the amount of marriage licenses obtained in Toronto should increase during the warm months of April through September and decrease during the cold months of October through March. By knowing whether or not more marriages occur during the summer months, prospective couples in Toronto can plan ahead and avoid peak seasons for applying for a marriage license and any delays that result.

In the Data section, we download marriage license data from opendatatoronto(Gelfand (2022)), a database maintained by the City of Toronto. This dataset features the number of marriage licenses issued in Toronto by month, beginning January 1 2011. We will be looking at data from 2023 and 2022, as well as any changes in the number of marriage licenses between the two years.

In order to test this hypothesis, we analyzed the data in the Results section by plotting the number of licenses against the month in which they were obtained and connecting the points

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\*Code and data are available at: <https://github.com/Diana-Guanzhi-Liu/Analysis-of-Toronto-Marriages>

with a line so we can see the change in the number of marriage licenses from month to month more clearly. Since there are only 12 data points in each graph, we are also able to lable each observation with the exact number of marriage licenses issued. Then we calculate \*\*\*\*\*

Our results show that our hypothesis is correct with the number of marriage licenses steadily increasing from February to May, peaking in August, then decreasing between August and November before hitting its lowest in January. This cyclic nature can be observed for both 2022 and 2023

## 2 Data

Our data is Marriage Licence Statistics from Open Data Toronto (Gelfand (2022)) which contains data sets maintained by the City of Toronto. The Marriage Licence Statistics dataset consists of monthly number of marriage licenses obtained from 2011 to 2023 in the Greater Toronto Area, it was last updated 2024-01-14. No similar data sets could have been used because this dataset is the only one of marriage licences. Looking at (Figure 1), the Marriage Licence Statistics dataset contains only four variables: `x_id`, `civic centres`, `marriage licenses`, and `date`, but only `civic centres`, `marriage licenses`, and `date` were used in our analysis. The data was cleaned and analysed using the statistical software R (R Core Team (2022)) with the assistance of `tidyverse` (Wickham et al. (2019)), `dyplr` (Wickham et al. (2023)), `ggplot2` (Wickham (2016)), `tinytex` (Xie (2023)), `gt` (Iannone et al. (2022)), and `stringr` ((**stringr?**)).

We selected the past two years due to some 2021 data being missing and the fact that Covid-19 in 2020 caused a significant decrease in the number of marriage licenses that were obtained all year compared to other years (Wagner, Kate H. Choi, and Cohen (2020)).

X_id	CIVIC_CENTRE	MARRIAGE_LICENSES	TIME_PERIOD
11101	ET	80	2011-01
11102	NY	136	2011-01
11103	SC	159	2011-01
11104	TO	367	2011-01
11105	ET	109	2011-02
11106	NY	150	2011-02

Figure 1: Sample of Raw Marriage License Data in Toronto

### 2.1 Civic Centres

`CIVIC_CENTRE` is the second column in Figure 1 and contains a two letter abbreviation of the city in which the marriage licenses are issued, ET for Etobicoke, NY for North York, SC

for Scarborough, and TO for Toronto. Each civic centre has its own row of corresponding date, number of marriage licenses, and id. During the data cleaning process, we filter out ET, NY, and SC so we can focus on Toronto. After filtering, we will not need the variable anymore (?@fig-cleaned\_toronto\_marriages).

## 2.2 Marriage Licenses

MARRIAGE\_LICENSES is the 3rd column in Figure 1 and denotes how many licenses were obtained. It is important to note that obtaining a marriage license is separate from the wedding ceremony itself, but the two often take place consecutively because a marriage license is required in the province of Ontario to become legally married (“Marriage Services” (2024)).

There are 12 observations per year for each month (Figure 2). This makes 24 observations for 2022-23 between 472 and 1758, with an average of 1043.3 marriage licenses obtained.

## 2.3 Date (Month)

TIME\_PERIOD is the month in which the marriage licenses were obtained in a yyyy-mm date format. When we clean the data, we must add a -dd to the end of each date value in order for the dates to be in an unambiguous format. Then the date is filtered by year to separate 2022 and 2023 from the rest of the dataset.

## 2.4 Cleaned Data

After the data we need has been cleaned, it is saved into 3 .csv files, one for 2022 and another for 2023, both of which have 12 observations one for each month. The third .csv file contains both years and has 24 observations. The only columns that remain in any file are Date and Marriages (Figure 2).

Date	Marriages
18993	472
19024	536
19052	1220
19083	1265
19113	1269
19144	1658

Figure 2: Sample of Cleaned Marriage License Data in Toronto by Month in 2022

### 3 Results

In order to determine if there is a difference in the amount of marriage licenses issued in Toronto between warm months (April to September) compared to cold months (October to March), we plot the number of marriage licenses for each month separately for 2022, 2023 and both years together. Then the points are connected with a path line to make the shape of changes over time easier to see. It is important to note that the lines in the graphs do not represent the actual rate of change between months because there is only one observation for each month. ## 2022 Marriage Licenses (Figure 3)

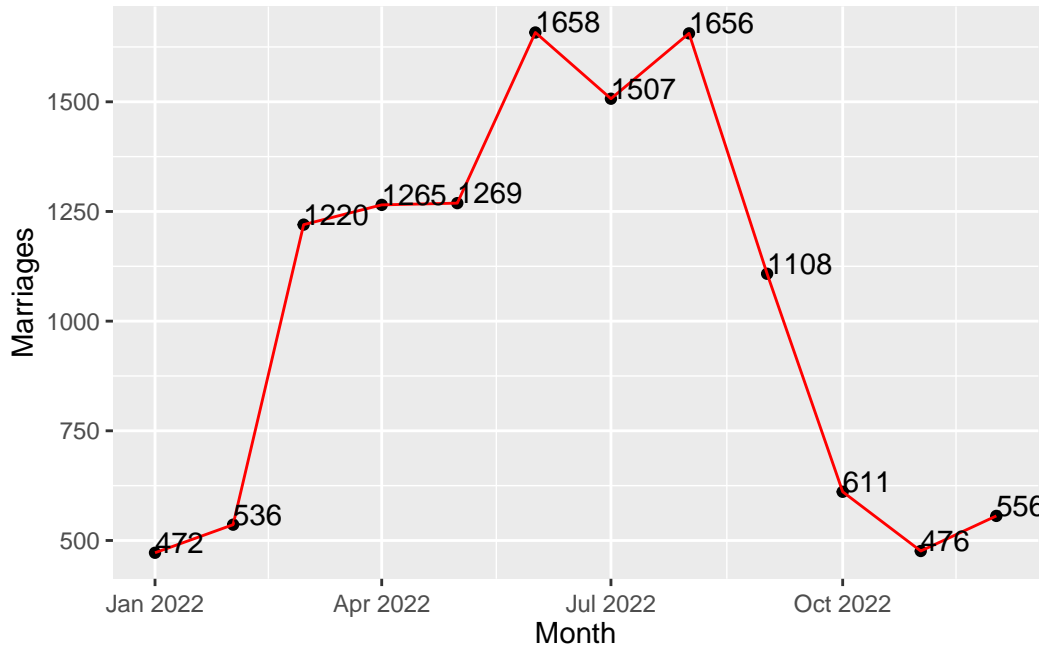


Figure 3: Number of marriage licenses issued in Toronto in 2022

We used ggplot to plot each marriage license observation for each month, then we connected the points so the trend over time is easier to observe. Looking at Figure 3, we can see that January has the lowest amount marriage licenses being issued of 472. A slight increase of 62 licenses occurs in February, followed by an increase in March of 684, more than doubling the amount in February. Then there is a slight plateau for 3 months before another increase to 1658 licenses in June, this is also the max in 2022 and a  $1658/472 \approx 350\%$  increase since January. There is another plateau which ends in September when the number of licenses falls to 1108. This decrease continues to October where the number of licenses plateaus once again around 500.

When we examine our graph separated into warm months (April, May, June, July, August, September) and cold months (October, November, December, January, February, March), we

can see that there is a 219% increase between the number of marriage licenses in cold and warm months

*Total Marriages Warm Months 2022*  $1265+1269+1658+1507+1656+1108 = 8463$  *Average*  $= 1410.5$  *Total Mar*

### 3.1 2023

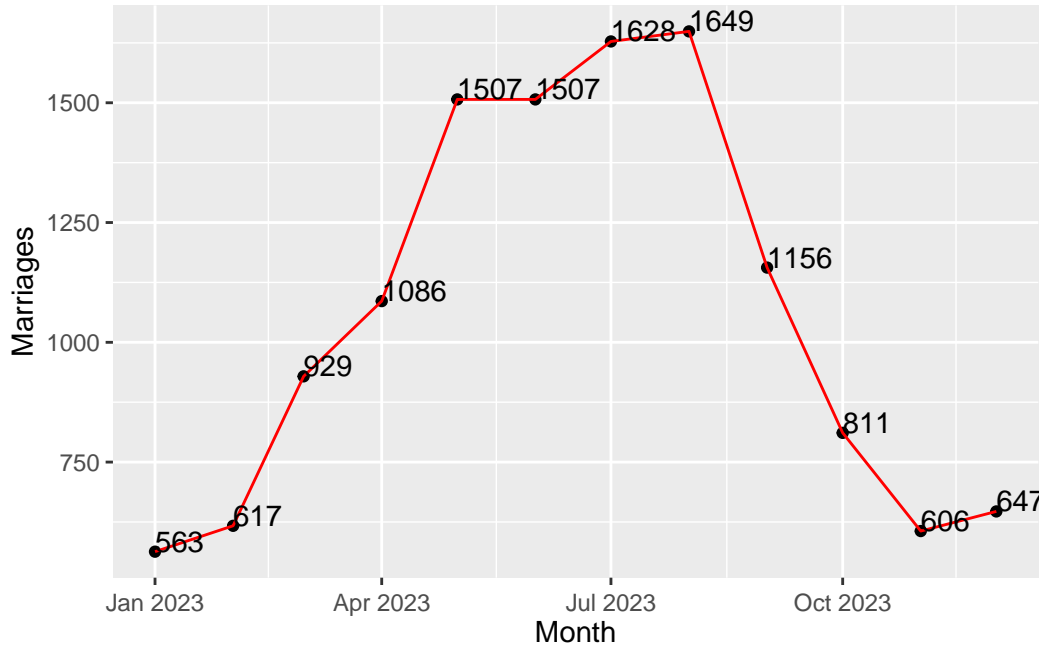


Figure 4: Number of marriage licenses issued in Toronto in 2023

2023 is similar to 2022 in terms of the general pattern of increases and decreases in the number of marriage licenses obtained (Figure 4). Once again January is the min and a large increase from 517 to 929 takes place between February and March. This increase continues until it hits 1507 licenses in May where it levels off. August is the max with 1649 licenses. The decrease like 2022, starts in September and continues until November.

\$\$ Total Marriages Warm Months 2022 \\  
 \ Average= \ Total Marriages Cold Months 2022 \\  
 \ Average= \ \$\$

## **4 Discussion**

### **4.1 Summary Statistics**

#### **4.1.1 2022**

Examining marriage licenses data from 2022, we find a max of 1658, min of 472, and average of 1028, for a combined total of 12334 licenses.

#### **4.1.2 2023**

In 2023, there was a max of 1649, min of 563, mean of 1058.8, and total of 12706 marriage licenses issued.

#### **4.1.3 Both Years**

Compared with the 2022 data, the total number of marriage licenses changed by  $(12334 - 12706)/12706 = -0.0292 \approx -2.92\%$ . This small amount of change indicates that approximately the same number of couples get married in Toronto each year, so any increases in the number of marriages for any given month is unlikely to be attributable to a total increase in marriages.

### **4.2 Second discussion point**

### **4.3 Third discussion point**

### **4.4 Weaknesses and next steps**

Weaknesses and next steps should also be included.

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