

# Trends in Toronto Public Libraries: A Study of 2012-2022 Toronto Public Library Data\*

My subtitle if needed

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This paper looks into four annual statistics released by the Toronto Public Library (TPL) system from 2012-2022 - number of visits, new registrations, circulation of materials, and computer usage. This report displays a down-trend in each of these statistics from 2012 to 2019 and a major hit to the TPL system during the COVID-19 pandemic. Following the 2020 hit, the TPL did improve, but each of the statistics, except one, did not recover to pre-pandemic levels. The only consistently upward trend in the entire paper is the number of new registrations.

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\*Code and data are available at: <https://github.com/Lwall02/What-Are-We-Using-Libraries-For>.

# 1 Introduction

With the ever-increasing accessibility of publications, like books, magazines, and newspapers, to name a few, you might wonder what libraries are really used for nowadays. It is well-known that a library is a place to come to read and learn. There is an immensity of resources available at most public libraries across all of the world, including public records, films, local newspapers, computers, socializing areas, and all kinds of publications. Despite the common thought that not many people go to libraries, it is still a strong belief that the absence of libraries would be a detriment to its surrounding community (Horrigan 2015).

To a lot of people, the ability to access the internet is nothing more than sitting down with their personal computer or using their phone connected to their wifi or cellular service. However, they may not consider that a significant portion of the community is not always fortunate enough to have this level of access. In today's world, access to the internet can be one of the single most important amenities. The Toronto Public Library (TPL) system offers free wifi at every branch and almost all of their 112 branches offer free computer stations (Library 2022e). In this paper, I look at TPL information from 2012 to 2022 covering the number of annual visits, new registrations, circulation of materials (called circulations), and computer station usage (called a computer sessions). I sought to find out why people are using the TPL, what amenities are increasing or decreasing, and how popular are libraries today compared to a decade ago.

My findings show that there is a definitive decrease in every statistic from 2012 to 2022 except for new registrations. They show a decrease in yearly visitors, circulations, and computer sessions, however the number of new registrations per year has countered these trends, in fact the number of new registrations in 2022 is more than that of 2012. We can also see the large impact the COVID-19 pandemic had on the TPL with major decreases in every statistic in 2020. Post-pandemic, the numbers in each of the four categories began to increase however, only new registrations were able to reach pre-pandemic levels by 2022.

The Data section of this paper provides an explanation on the TPL data used in this paper and the steps that went into making this data usable and readable for a report. The Results sections displays the trends explained above, and explains how they were reached. The Discussion sections provides greater detail on the trends explained above and some information on the possible shortcomings of the analysis. The Conclusion sections summarizes the findings from this paper.

## 2 Data

Data used in this paper was downloaded from Open Data Toronto (Gelfand 2022). I downloaded a total of five data sets published by the Toronto Public Library: Library Branch General Information (Library 2023), Library Visitors (Library 2022c), Library Workstation Usage (Library 2022d), Library Card Registrations (Library 2022a), and Library Circulation (Library 2022b). The data was worked with entirely on the open source programming language R (R Core Team 2022). I used the following packages to clean and analyze the data: tidyverse (Wickham et al. 2019), ggplot2 (Wickham 2016), patchwork (Pedersen 2024), knitr (Xie 2023), and dplyr (Wickham et al. 2023).

### 2.1 The Data Sets

I downloaded the five above mentioned data sets and in order to conduct my analysis I merged four of them into one table. The cleaning and merging of the data sets is explained below.

It is important to note that there was usable data from 96 to 100 different TPL branches across the Greater Toronto Area each year from 2012 to 2022 (further explanation below). Each branch is attached with a branch code that is two capital letters. For example, the Lillian H. Smith Library located just South of the University of Toronto is labeled LS. You will see these branch codes in tables and graphs later in the paper.

#### 2.1.1 The Library Branch General Information

The Library Branch General Information data set was only used in two ways for this paper. It provided a key to attach a library's branch code with its full name and address, and it separated the physical branches from the 'non-physical' branches. The physical branches are the libraries you can visit, the 'non-physical' libraries are services like a bookmobile or a virtual library. The 'non-physical' libraries are shown in Table 1.

Table 1: This shows the 12 non-physical branches as of 2023 along with their TPL given name

Branch Code	Branch Name	Physical Branch (1 - Yes/ 0 - No)
AL	Answerline	0
BKONE	Bookmobile One	0
BKTWO	Bookmobile Two	0
DS	Departmental Staff	0
HLS	Home Library Service	0
IL	Interloan	0
LD	Literacy Deposits	0
ME	Merril Collection	0

Branch Code	Branch Name	Physical Branch (1 - Yes/ 0 - No)
OS	Osborne Collection	0
PR	Automated Phone System	0
SB	Sunnybrook Hospital	0
VIR	Virtual Library	0

It is important to separate and remove the ‘non-physical’ libraries from all the data sets because they introduce very different values in each of the categories I am looking at. The ‘non-physical’ libraries recorded their visits, registrations, circulations, and computer sessions in different ways. For example, the visits would have been clicks to a website or number of visitors into a mobile library. In this paper, I am focused on the popularity of the physical library and so this data does not serve to tell me how a physical library is performing.

### 2.1.2 The Library Card Registration, Circulation, Visits, and Workstation Usage

These four data sets, The Library Card Registration, Circulation, Visits, and Workstation Usage, serve as the essential data for this paper. As they are also released by the TPL system, they follow the exact same branch code organization. Each of the four data sets gives data for each branch code for every year from 2012 to 2022. They are similar data sets to each other in that are the year the year, branch code, and number of the value that is to be shown (visits, registrations, circulations, or sessions).

## 2.2 Cleaning the Data

The first step of cleaning the data so that I could analyse it in an efficient way was to combine the visits, registrations, circulations, and sessions, into one table according the year and branch code. In that way all the information stays aligned with the correct library branch it was taken from and the correct year. The second step was to use the `clean_names()` function in the `janitor` package. The third step was to remove the ‘non-physical’ branches so that the data I analyse is from physical libraries only. A sample of final table with each of the four statistics aligned with branch code and year is found in Table 2. An explanation of the four variables is found in Results.

Table 2: This shows 10 rows of the final table used for analysis. It contains every branches information for each year from 2012-2022 organized such that the most visited library per year is at the top

Year	Branch Code	Visits	Registrations	Circulations	Sessions
2012	CL	1493796	10291	1703346	484789
2012	TRL	1137016	8682	355367	727822

Year	Branch Code	Visits	Registrations	Circulations	Sessions
2012	AB	522309	4939	515235	132024
2012	WS	488396	2013	542341	105207
2012	FV	442214	4064	890759	164649
2012	AG	434320	3166	1061437	140407
2012	RI	421962	3082	791674	131921
2012	CED	415753	4750	731057	240834
2012	ND	407488	2755	489994	127600
2012	BRW	392397	2015	518725	41350

### 3 Results

First, I will explain what each variable is that you will see in this section. The ‘Visitors’ describes the number of visitors per year at a library branch. The ‘Registrations’ describes the number of library cards registered at a library branch per year. The ‘Circulation’ describes the number of materials that were checked out and returned during the year at a library branch. The ‘Sessions’ describes the number of computer sessions at a library’s public workstation per year. A computer session lasts a duration of at least 15 seconds.

Second, the number of library branches did not stay the same every year. There were anywhere from 100 to 104 library branches in the datasets downloaded from Open Data Toronto, however there was only ever 96 to 100 active physical branches. This can be seen in Figure 1.

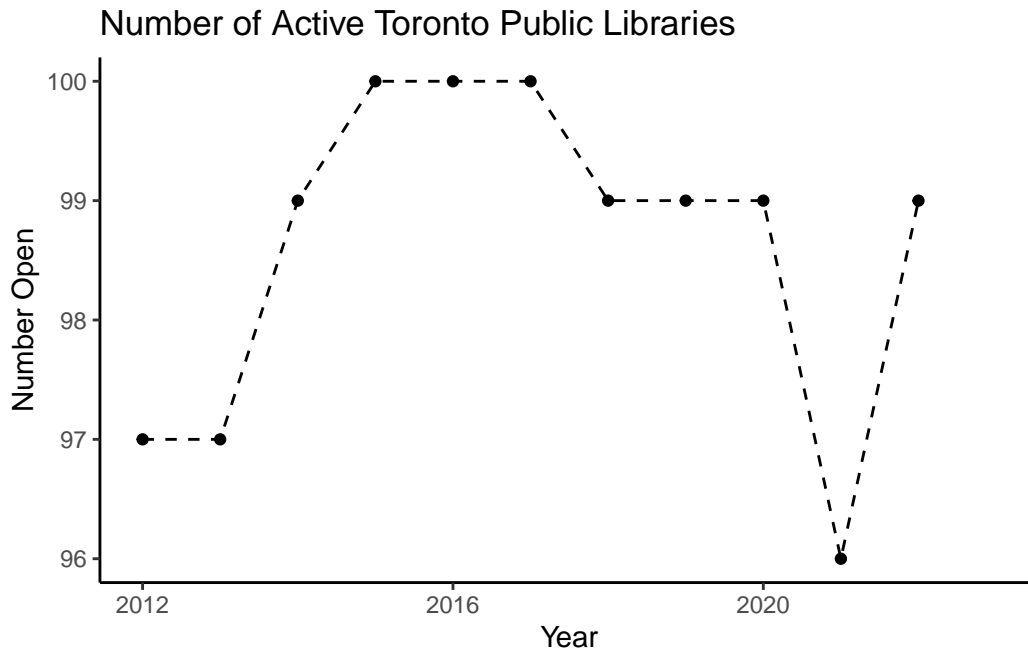


Figure 1: This shows the variation in the number of library branches each year

The results of this analysis followed from looking at the trends of the data over the years 2012 - 2022. The first step was to try and see how the libraries performed each year based on the four variables listed above. The four scatter plots in Figure 2 show the count of every variable from 2012 - 2022. In this format it is hard to see whether visits are increasing or decreasing, especially from 2012 - 2019, and the same goes for the other three variables. The biggest takeaway from this view is that the COVID-19 pandemic did effect the libraries in 2020. It is hard to say exactly how much the libraries were effected by looking Figure 2, but we can see that the visits, registrations, circulations, and sessions, have no large values in 2020.

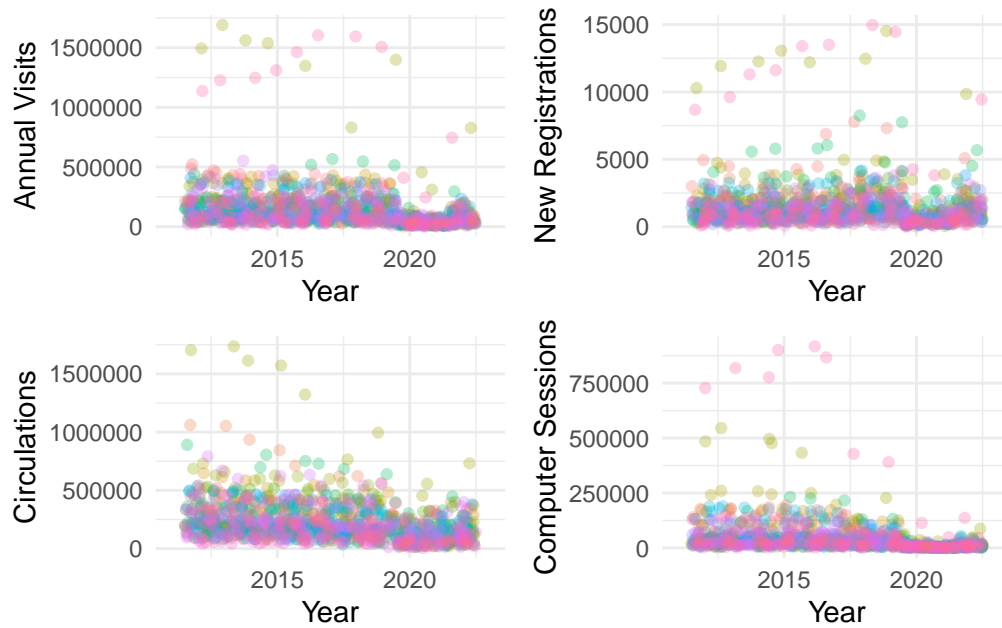


Figure 2: A visual of all the data used for this analysis, organized by year. Each color represents a value for a library branch

In Figure 2, it is hard to determine any kind of trend among the visits, registrations, circulations, and computer sessions from 2012 - 2019 because there is so many points crowding the same space. In order to look closer at the trends of these variables, I look at the averages of each variable over all the branches each year. This is visible in Figure 3.

As you can more clearly see in Figure 3, yearly visits has been steadily decreasing across all TPL from 2012 to 2022. More drastically, yearly circulations has also been decreasing since 2012. When looking at the new registrations and computer usage there is a different trend. Surprisingly, despite less visitors and less materials being checked out, computer sessions and new registrations were increasing from 2012 - 2015. From 2016 onwards, computer sessions have decreased significantly while new registrations have remained increasing.

Once COVID-19 struck in 2020, every variable took quite a hit. In Figure 3, we can see every variable has dropped to near the x-axis in 2020. More specifically, from 2012 to 2020 average yearly visits have dropped by 71%, new registrations dropped by 56%, circulation dropped by 66%, and sessions dropped by 84%, averaging a 69% loss in all four statistics.

After 2020, during 2020 - 2022, visitors, circulations, and especially new registrations have increased. In fact, new registrations has increased by 10% since 2012. Average computer sessions, however, has remained very low compared to its previous averages. Comparing 2020 to 2022, visits have increased by 70%, new registrations by 147%, circulations increased by 50%, and sessions increased by 43%. Keeping in mind that in 2020, circulation previously decreased

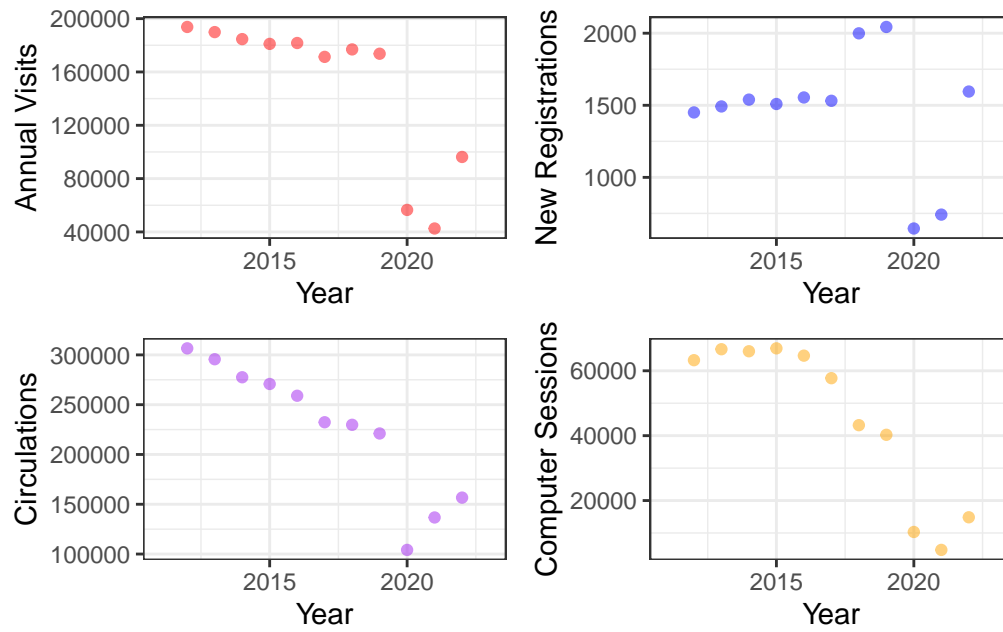


Figure 3: A visual of the average of each variable from 2012 - 2022. We can more clearly see the negative trends of each variable.

by 66% compared its annual numbers in 2012, whereas computer sessions had decreased 84% compared to 2012.



## 4 Discussion

After looking at this data, we can say that the libraries are not being used as much as they were in 2012. The average number visitors per year was slowly decreasing from 2012 - 2019, and post-pandemic these numbers have not recovered to where they should have been if it followed this trend in 2020. This can be due to many things, but the biggest and most obvious of those being people are reading less. We can see this clearly in Figure 3 where the trend of circulations has been steeply decreasing across 2012 - 2019. In 2012 there was an average of around 310,000 circulations per year where in 2019 there was an average of around 220,000 circulations. That is to say circulations have decreased almost 30% in 2019 compared to 2012, which is pre-pandemic.

As for the new registrations and computer sessions we see a somewhat different looking trend. First of all, computer sessions was trending upwards until 2015, however, after 2015 the average number of computer sessions began quickly declining. In 2018 and 2019, computer sessions took an even larger decrease in average yearly use, dropping from around 60,000 yearly sessions to around 40,000, a 33% decrease pre-pandemic. On the other hand, new registrations has been slowly, but steadily, increasing from 2012 - 2019. In 2018 and 2019, new registrations were the highest they have ever been, increasing from about 1,500 yearly registrations per branch to 2,000, a 33% increase. And post-pandemic we can see that new registrations have risen to meet their pre-pandemic average at around 1600, whereas average yearly computer sessions have remained quite low in 2020 - 2022, at around 14,000 sessions yearly per branch.

Of the four statistics, new registrations is the only one with a steady increase, and the only one especially to come close to its pre-pandemic averages. Visitors, circulations, and computer sessions have all remained relatively down. Among these, circulations is the only one with a steady increase since 2020, with an increase of 31.3% to 2021 and an additional 15% into 2022. Visitors have increased noticeably according to Figure 3 since 2022, however they still remain about 45% of what they used to be pre-pandemic in 2019.

It is important to acknowledge that this report is not without flaws and limitations. In particular, there was some data lost in while merging the library's four data sets. There is another limitation in that the averages could only be taken over the libraries that had data in the correct column. That is some library branches had no data in certain years for circulation, registration, and computer sessions. Also, working with strictly annual data may have reduced the accurateness of some of the statistics, particularly during 2020-2021 where monthly data may have provided a better estimate on the performance of the libraries in these years. Perhaps some of the libraries were closed due to COVID-19 during certain months and the annual data does not reflect this.

## 5 Conclusion

Overall, the Toronto Public Library system is in worse shape than in 2012. This partly due to the fact many people have access to the internet where they no longer require getting physical copies of books or even going to the library to use the internet. And another part is that the TPL didn't act quick enough to counter the decreasing visitors and decreasing circulation pre-pandemic. There is something to be said for the large increase in new registrations during 2018 and 2019, found in Figure 3, but because of the pandemic drastically changing each of the statistics, we cannot yet know if this increase in registrations would have also effected the other three variables.

By 2022, every variable had experienced increases since 2020, so in a couple years time there could be further increases that would counter the argument of this paper. And to sum up the argument of this paper, libraries need to adapt to today's trends because right now they are still losing popularity. Nowadays people are reading less and have much easier access to the internet than ever before, even in 2015. The greatest successes of the TPL was in 2012 - 2015 where despite major circulation decreases, computer usage and registration were, in fact, increasing. This is almost ten years ago so, unfortunately, the pandemic cannot explain all of the TPL's loss in popularity.

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