

# DSCI 310: Historical Horse Population in Canada

Nika Karimi Seffat

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## 1 Aim

The aim of this report is to analyze historical trends in the horse population across Canada. By examining open government datasets and applying reproducible data analysis techniques, we seek to identify key demographic shifts and inform future agricultural policies (Timbers 2020).

## 2 Data

Horse population data were sourced from the [Government of Canada's Open Data website](#) (Government of Canada 2017a, 2017b)

### 3 Methods

The R programming language (R Core Team 2019) and the following R packages were used to perform the analysis: knitr (Xie 2014), tidyverse (Wickham 2017), and Quarto (Allaire et al. 2022). *Note: this report is adapted from (Timbers 2020).*

### 4 Results

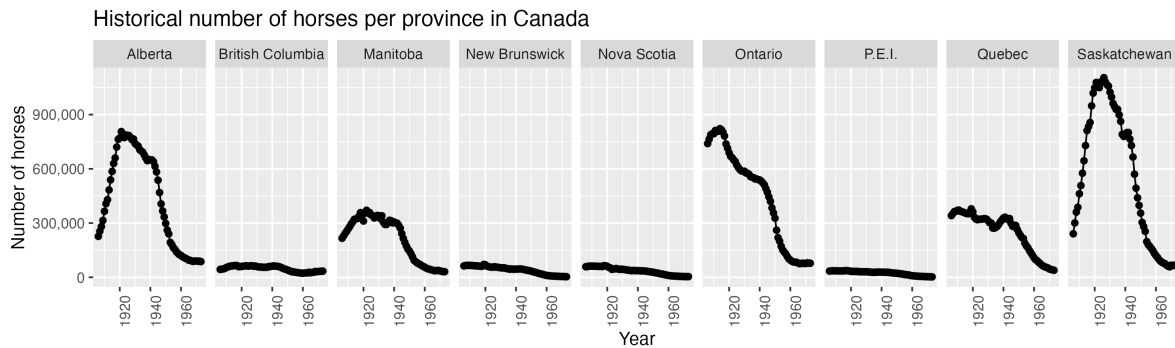


Figure 1: Horse populations for all provinces in Canada from 1906 - 1972.

We can see from Figure 1 that Ontario, Saskatchewan and Alberta have had the highest horse populations in Canada. All provinces have had a decline in horse populations since 1940. This is likely due to the rebound of the Canadian automotive industry after the Great Depression and the Second World War. An interesting follow-up visualisation would be car sales per year for each Province over the time period visualised above to further support this hypothesis.

Suppose we were interested in looking in more closely at the province with the highest spread (in terms of standard deviation) of horse populations. We present the standard deviations in Table 1.

Table 1. Standard deviation of historical (1906-1972) horse populations for each Canadian province.

```
Rows: 9 Columns: 2
-- Column specification -----
Delimiter: ","
chr (1): Province
dbl (1): Std

i Use `spec()` to retrieve the full column specification for this data.
i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

Table 1: Standard deviation of historical horse populations for each Canadian province between 1906 - 1972.

| Province         | Std       |
|------------------|-----------|
| Saskatchewan     | 377265.58 |
| Ontario          | 266435.32 |
| Alberta          | 266063.19 |
| Manitoba         | 122403.87 |
| Quebec           | 111411.10 |
| New Brunswick    | 22019.49  |
| Nova Scotia      | 19879.25  |
| British Columbia | 14945.66  |
| P.E.I.           | 11355.75  |

Note that we define standard deviation (of a sample) as

$$s = \sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x})^2}{N - 1}}$$

Additionally, note that in Table 1 we consider the sample standard deviation of the number of horses during the same time span as Figure 1.

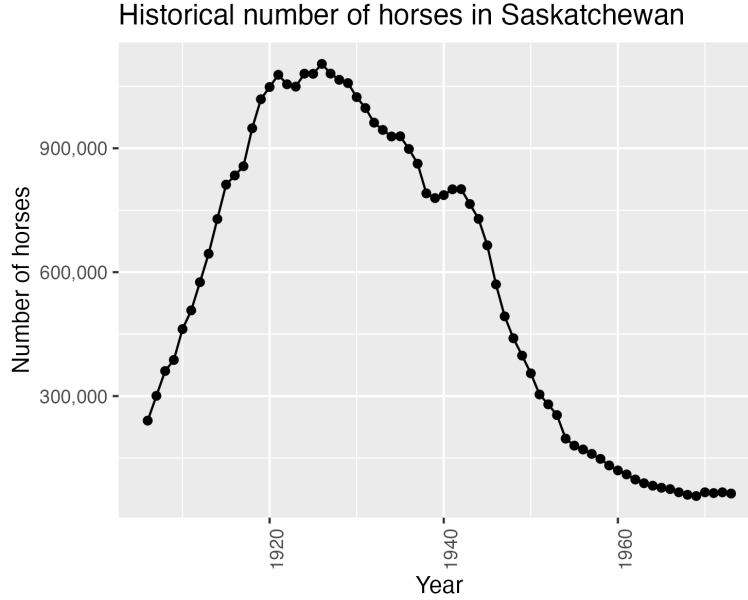


Figure 2: For the province with the biggest standard deviation - the horse population

In Figure 2 we zoom in and look at the province of Saskatchewan which had the largest spread of values in terms of standard deviation.

## References

- Allaire, J. J., Charles Teague, Carlos Scheidegger, Yihui Xie, and Christophe Dervieux. 2022. “Quarto.” <https://doi.org/10.5281/zenodo.5960048>.
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