1. Introduction
   1. Background on the COVID-19 pandemic's impact on transit ridership in King County, WA
   2. Research question and hypothesis
2. Literature Review
   1. Previous studies on transit ridership recovery
   2. Relevant theories and models
   3. Impact of COVID-19 vaccine distribution
3. Methodology
   1. Data sources and variables
   2. Data analysis and visualization
   3. Time-series forecasting model
      1. Factors included
         1. Employment density
         2. Land use
         3. Population density
         4. Demographic characteristics
         5. Percentage of population vaccinated in each census tract
4. Results
   1. Description of census tracts' recovery patterns
   2. Time-series forecasting model results
5. Discussion
   1. Interpretation of the results
   2. Implications and recommendations for policy and planning
6. Conclusion
   1. Summary of the study
   2. Limitations and future research directions
      1. King County may not be representative of other regions in the U.S.
      2. Data only covers the period from 2019 to present, which may not capture long-term trends or changes in ridership

**Abstract**

This study examines the transit ridership recovery patterns in King County, WA since the outbreak of COVID-19. Our hypothesis holds that within King County, certain census tracts' ridership levels have more or less stabilized, while others are still on their way to recovering more ridership in the future. Using the "stabilized" census tracts' data, a time-series forecasting model is developed to predict when the rest of the census tracts will finish their recovery and at which ridership rates they will stabilize. The study utilizes data from multiple sources and employs various data analysis and visualization techniques. The results suggest that some census tracts have indeed stabilized on their current ridership levels, while others are still recovering. The time-series forecasting model predicts that the recovery process will continue, albeit at a slower pace, and that the ridership rates will eventually stabilize at different levels for different census tracts. The study provides insights into the transit ridership recovery patterns in King County, WA, and can inform policy and planning decisions in the future.

**Introduction**

The COVID-19 pandemic has had a significant impact on urban transit worldwide, with transit ridership rates plummeting in many cities across the globe (cite). In King County, WA, the pandemic has severely impacted ridership rates, with daily ridership decreasing by nearly \_% in March 2020 compared to March 2019. Since then, King County Metro, the public transit authority of the region, has implemented numerous measures to promote safety and encourage riders to return, including mask mandates, increased cleaning, and social distancing protocols (cite). However, despite these efforts, transit ridership in King County has yet to fully recover.

The purpose of this study is to examine the transit ridership recovery patterns in King County since the outbreak of COVID-19. Specifically, we aim to identify which census tracts have stabilized in their recovery and which census tracts are still on their way to recovering ridership rates. We also seek to identify which factors have been most influential in predicting ridership rates since the pandemic, when the rest of the census tracts will stabilize, and at which levels. We use a time-series analysis to identify the current state of stabilization using post-COVID data. Additionally, we use LASSO to select features that are most important in predicting ridership and clustering methods to identify at which levels the ridership in the census tracts will stabilize. The results of this study will provide insights into the transit ridership recovery patterns in King County, WA, and can inform policy and planning decisions in the future. Furthermore, this study can serve as a template for similar analyses in other cities or regions impacted by the COVID-19 pandemic.