

TRANSPORT FINDINGS

COVID-19 Impacts On-Demand Ridership in New South Wales: Regional Services More Stable than Urban Counterparts

Benjamin Kaufman¹ ¹ Cities Research Institute, Griffith University

Keywords: covid-19, on-demand, new south wales, australia, microtransit, drt, transit ridership, travel behavior

<https://doi.org/10.32866/001c.18979>

Findings

COVID-19 had a major impact on transit ridership and behavior patterns in New South Wales, Australia, and around the world. This paper evaluates impact on on-demand ridership levels using data from the New South Wales Open Data Portal. By separating services by urban and regional locality, it became clear that COVID-19 had impact patronage in different ways. The results demonstrate that locational context can fundamentally impact on-demand service uptake.

Questions

Travel has changed drastically since the onset of COVID-19 in Australia. While global responses vary, overall travel is down (Jamal and Paez 2020; Astroza et al. 2020). Early research efforts during the pandemic demonstrate changes in behavior for private motor vehicles and public transport, rises in active transport, especially cycling (Lock 2020). Research has classified the pandemic into three stages; Pre-Covid, COVID lockdown, and Post-Lockdown (Praharaj et al. 2020). NSW responded to the pandemic initially by quarantining returning travelers and expanded restrictions to limit local travel and business operations from late March until easing began in mid-May and continued for the remainder of the study period (Duckett and Stobart 2020; New South Wales Government 2020b, 2020a).

New South Wales (NSW) has been at the forefront of trialing on-demand transit systems in Australia, launching 28 different services since October, 2017. On-demand transit, otherwise known as demand responsive transit, is “an intermediate form of transport, somewhere between the bus and taxi and covers a wide range of transport services ranging from less formal community transport through to area-wide service networks” (Enoch 2004). This paper examines on-demand transit ridership in NSW through the pandemic.

The following research questions are examined:

- Did ridership of on-demand services change due to COVID-19 in NSW?
- Did ridership changes vary significantly based on geography?

Methods

All operational on-demand services in New South Wales providing over 1,000 monthly trips in December, 2020 were studied. The services have varied individual characteristics, such as different operators, technology providers, hours of service, fares, vehicle types, booking methods and operational models. Service specifications can be explored at the webpage <https://transportnsw.info/travel-info/ways-to-get-around/on-demand>. Only services in New South Wales were chosen as they shared a timeline of COVID-19 restrictions to allow comparison. This allowed for comparison between differing settings of urban form to understand the scale of impacts on ridership during each of the three stages of the pandemic.

The New South Wales Open Data Portal was used to access these data, providing aggregated monthly trip volumes across each service zone. While monthly data is not granular enough to demonstrate specific lockdown measures, it does provide insight into overall behavioral patterns. In this study, March and April represent the most intense periods of lockdown, while time periods before and after are pre- and post-lockdown respectively.

From the trip volumes, services were separated by urbanity – those in Sydney (five services) and those outside of the major metropolitan area (five services). Monthly percent changes in patronage for each service were calculated between August 2019 and December 2020, allowing for comparison between growth rates prior to, during, and post-lockdown. Additional analysis was performed to calculate service performance compared to the prior year at the same time, while outliers were removed.

Findings

Patronage decreased across on-demand services due to COVID-19, shown in [Figure 1](#). Decreases in March were followed by larger decreases in April. For the following analyses, services in blue are found in metropolitan Sydney (urban), while services in red are located outside of the capital city (regional).

While patronage numbers are always of interest, it is becoming clear that simply looking at number of trips taken upon a service is insufficient to evaluate service performance. Prior to COVID-19, urban services delivered the three highest patronage services. Notably, towards the end of 2020, the Northern Beaches experienced a large decrease in patronage due to increased restrictions following a localized outbreak of COVID-19. During statewide lockdown, urban services occupied only the top spot, followed by two regional services. This is largely due to consistency in regional demand and major falls in urban ridership. By limiting evaluation to total trips per month, there is no clear trend to separate regional from urban services.

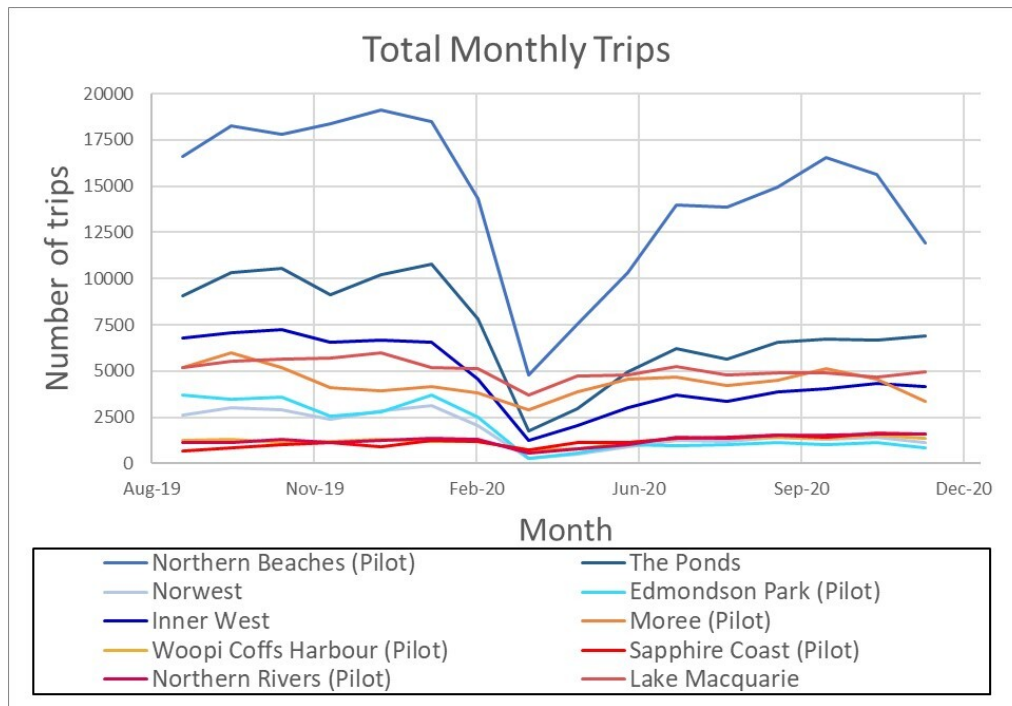


Figure 1: Trips per month by service in NSW. Only services reporting over 1,000 monthly trips were included.

Impacts on monthly ridership

Urban and regional services reacted in a statistically significantly different way (shown in [Figure 2](#)) to the onset of COVID-19, with April ridership in urban areas falling on average by 79% of the previous month's patronage levels. Regional services were still affected, losing on average 36% of patronage per service. However, since April, each service has experienced an increase in patronage for at least four of the five months of available data. In August, each service experienced growth in ridership, with urban services expanding on average by 13.4% compared to regional growth of 6.5%.

Long-term impacts on ridership

In comparison to performance a year ago, a different trend appears. Monthly patronage in September on urban services fell on average 39% from the same month in 2019 while regional services have grown 7% over the same time period. Regional services are the only ones to have maintained growth in spite of the pandemic.

[Figure 3](#) demonstrates that urban and regional on-demand services in New South Wales have been impacted differently by COVID-19. Urban services faced large initial declines in ridership, with April 2020 ridership in Edmondson Park and Inner West falling to 13% and 18% respectively of their April 2019 patronage. Regional services were less volatile, with the Northern Rivers facing the greatest decline to 85% from April 2019. Regional services continue to provide more rides than in previous years, servicing 7% more rides in September, 2020 than in September, 2019. In contrast, urban services

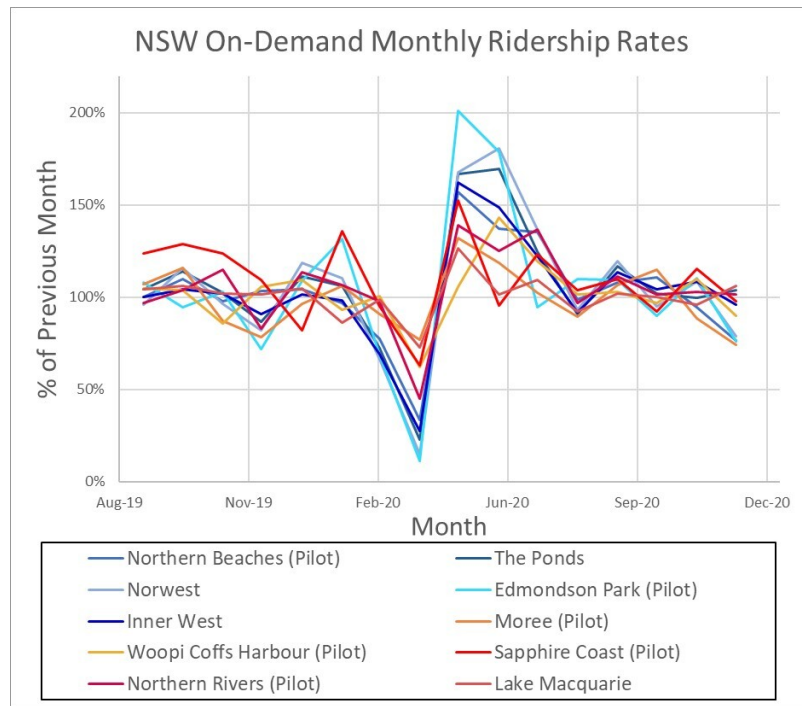


Figure 2: Urban services face greater volatility month-on-month, with the largest decreases in ridership percentage and the highest return percentages.

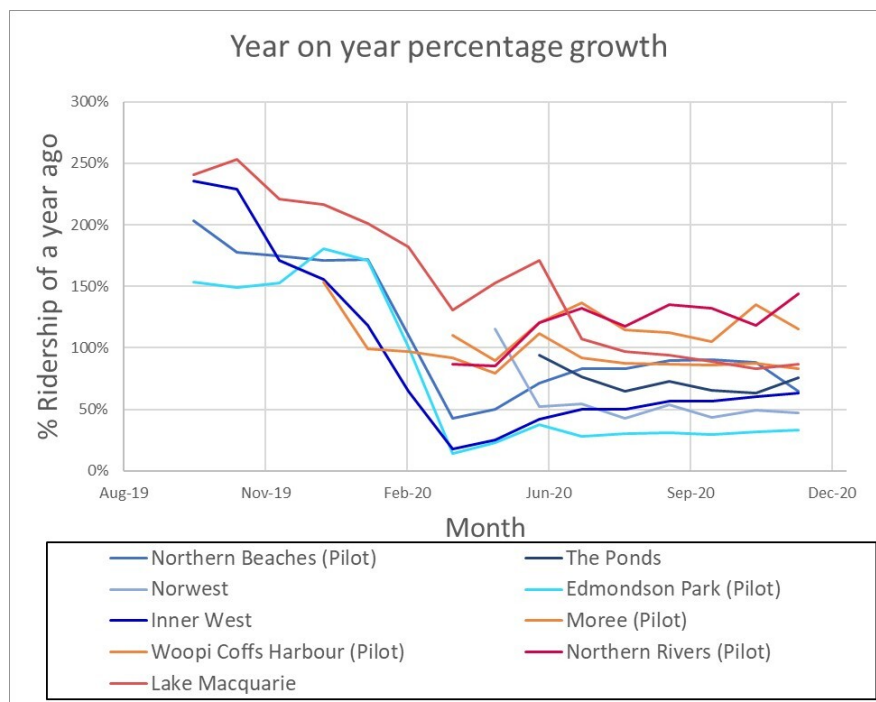


Figure 3: On-demand ridership compared to the same month the year before. Shorter lines have been in operation for fewer months limiting comparison options to the previous year. Sapphire Coast was removed from this particular analysis due to data limitations.

provided 60.7% of the number of rides on average across the same time periods. Overall, regional services are the only ones to have grown in the past year and provide the highest four ridership percentages year-on-year.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the Queensland Department of Transport and Main Roads Transport Academic Partnership for supporting this research. Additionally, Transport for New South Wales's open data policy should be commended, without it this research would not have been possible.

Submitted: December 01, 2020 AEDT, Accepted: January 27, 2021 AEDT



This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CCBY-SA-4.0). View this license's legal deed at <https://creativecommons.org/licenses/by-sa/4.0> and legal code at <https://creativecommons.org/licenses/by-sa/4.0/legalcode> for more information.

REFERENCES

- Astroza, Sebastian, Alejandro Tirachini, Ricardo Hurtubia, Juan Antonio Carrasco, Angelo Guevara, Marcela Munizaga, Macarena Figueroa, and Valentina Torres. 2020. "Mobility Changes, Teleworking, and Remote Communication during the COVID-19 Pandemic in Chile." *Findings*. <https://doi.org/10.32866/001c.13489>.
- Duckett, Stephen, and Anika Stobart. 2020. "Australia's COVID-19 Response: The Story so Far." 2020. <https://grattan.edu.au/news/australias-covid-19-response-the-story-so-far/>.
- Enoch, Marcus. 2004. "INTERMODE: Innovations in Demand Responsive Transport." Department for Transport and Greater Manchester Passenger Transport Executive.
- Jamal, Shaila, and Antonio Paez. 2020. "Changes in Trip-Making Frequency by Mode during COVID-19." *Transport Findings*.
- Lock, Oliver. 2020. "Cycling Behaviour Changes as a Result of COVID-19: A Survey of Users in Sydney, Australia." *Findings*. <https://doi.org/10.32866/001c.13405>.
- New South Wales Government. 2020a. "Additional COVID-19 Restrictions in Place for NSW." <https://www.nsw.gov.au/news/nsw-to-ease-covid-19-restrictions-from-friday-15-may>.
- . 2020b. "NSW to Ease COVID-19 Restrictions from Friday 15 May." <https://www.nsw.gov.au/news/nsw-to-ease-covid-19-restrictions-from-friday-15-may>.
- Praharaj, Sarbeswar, David King, Christopher Pettit, and Elizabeth Wentz. 2020. "Using Aggregated Mobility Data to Measure the Effect of COVID-19 Policies on Mobility Changes in Sydney, London, Phoenix, and Pune." *Findings*. <https://doi.org/10.32866/001c.17590>.