

Exploring Patterns of Interstate Telemedicine Using A Data Visualization Framework

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Background

- During the COVID-19 pandemic, telemedicine experienced a surge in popularity, with 766% growth within the initial three months compared to the pre-pandemic era.¹
- In 2020, pivotal changes were instituted in the U.S. through the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) and the Public Health Emergency (PHE) protocols, including provisions that eased the use of telemedicine across state lines.²
- The US PHE ended in May 2023, and currently, many of the policy flexibilities that enabled interstate telemedicine have been extended on a temporary basis. Some states have enacted legislation to either render the waivers permanently or extend them for a predetermined period. Conversely, others have discontinued cross-state licensing waivers, thereby impacting numerous individuals.³
- Some states permit providers from neighboring states to offer telemedicine services within their jurisdiction if they share a common border. In contrast, others mandate providers to undergo licensing examinations to continue delivering care.⁴

Problem statement

- Our objective is to visualize patterns of interstate and intrastate care during the COVID-19 public health emergency, including which states predominantly served as caregivers or care receivers and to further investigate, using ZCTA codes, the counties' specific tendencies—whether they predominantly initiated telemedicine interactions or predominantly provided care.

Methods

- Timeframe: January 1, 2022, to January 1, 2023.
- Data was sourced from Doxy.me, a prevalent commercial telemedicine platform widely utilized by individual providers, clinics, and healthcare organizations.⁵ It is employed in 8-30% of daily telemedicine sessions in the US.⁶⁻⁸
- We used a data visualization framework to conduct preliminary analysis of interstate telemedicine use during the COVID-19 public health emergency.

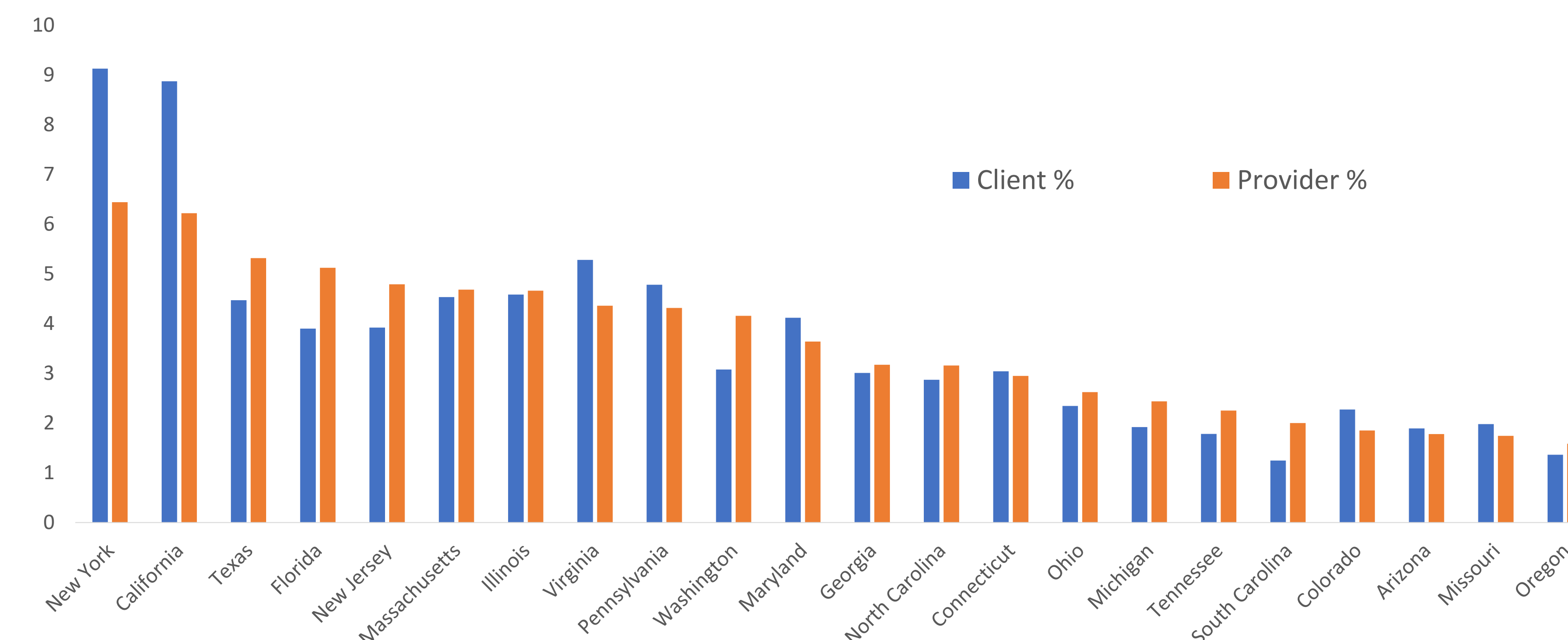


Fig 1: Percentage, client role, and provider role during interstate telemedicine sessions

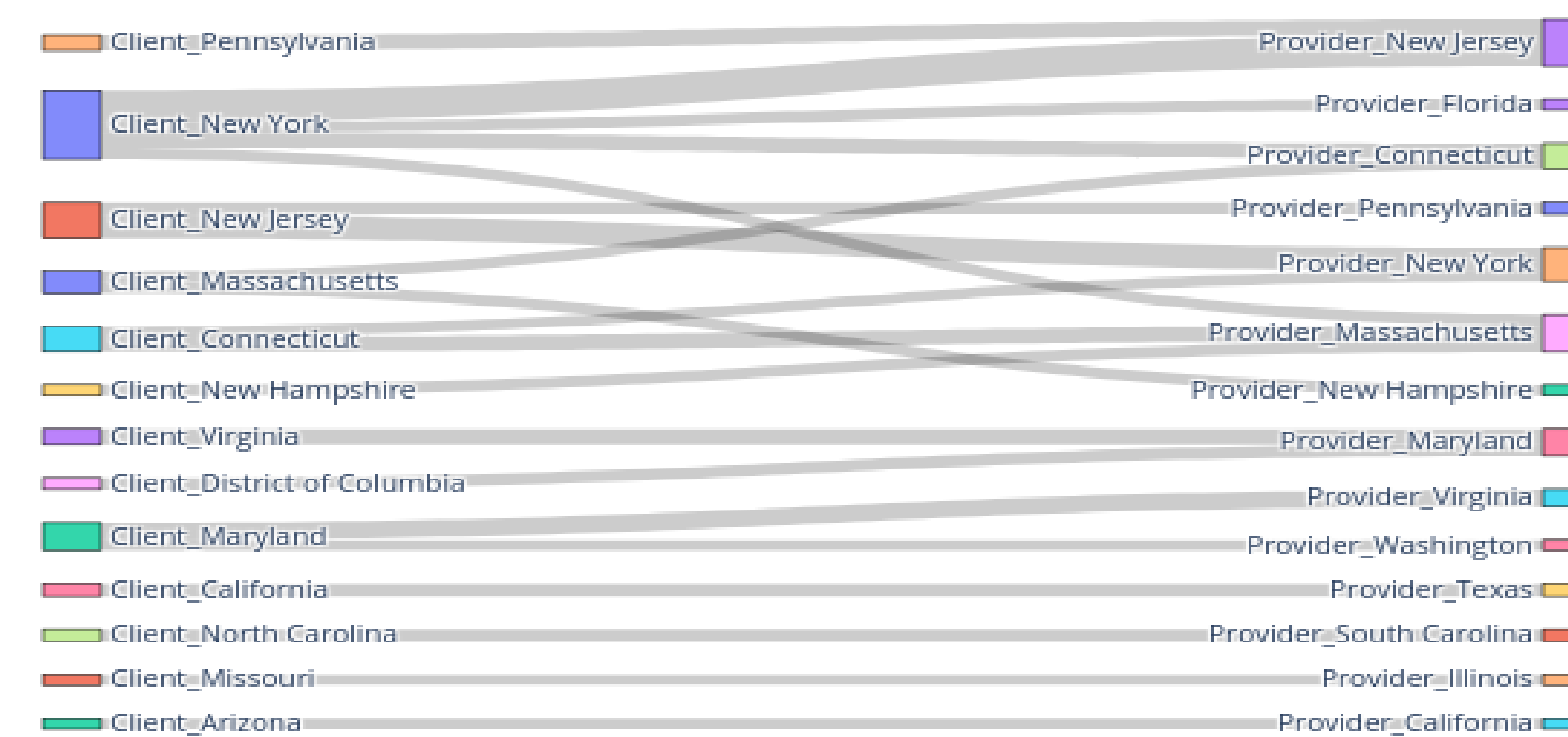


Fig 2: Sankey diagram showing calls between client and provider

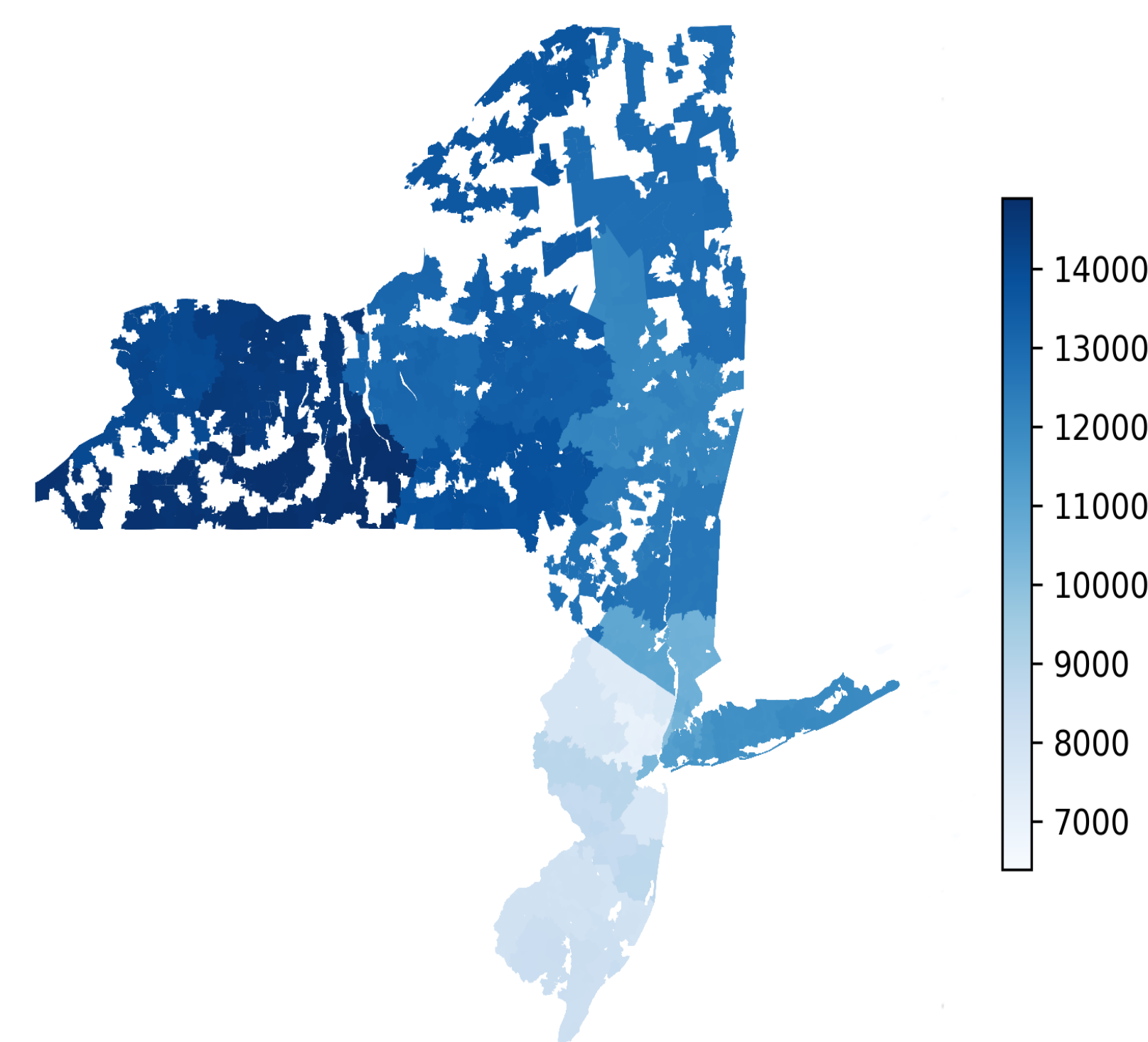


Fig 3: Counties of clients in New York and New Jersey

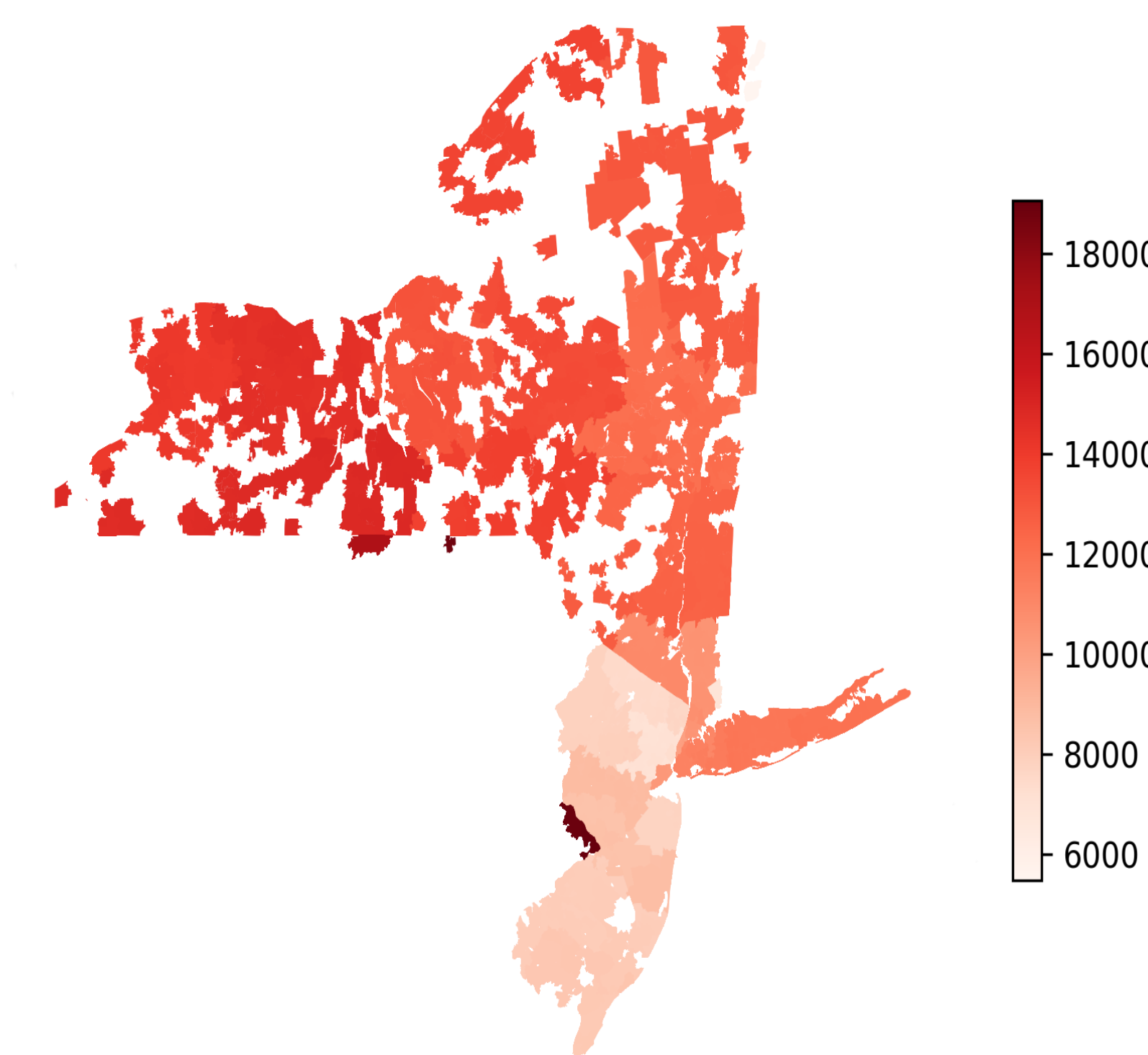


Fig 4: Counties of providers in New York and New Jersey

Results

- After data preparation, we analyzed 7,334,167 telemedicine sessions.
- Total interstate sessions: 2,097,330 / 7,334,167 (28.59%)
- Fig. 1 shows New York and California have higher clients compared to providers.
- Fig. 2 illustrates the flow of sessions from the client state to the provider state. The thickness of each line represents the volume of calls made.
- Fig. 3 highlights specific counties within New York and New Jersey based on client and providers ZCTA codes.
- Highest interstate sessions:
 - 1) New York to New Jersey: 41,386 sessions
 - 2) New Jersey to New York: 31,061 sessions
 - 3) Maryland to Virginia: 23,153 sessions

Discussion

- These findings are preliminary in nature and the analysis is ongoing.
- New York and California predominantly function as care receivers, with a higher number of clients relative to available providers. In contrast, Texas, Florida, and New Jersey emerge as important care providers, characterized by a larger provider base compared to their client count.
- Interstate cooperation around border cities is evident; a substantial volume of calls originate from clients in New York to providers in New Jersey and vice versa.
- A substantial proportion of telemedicine occurred across state lines during the COVID-19 public health emergency.

References

- Shaver J. The State of Telehealth Before and After the COVID-19 Pandemic. Prim Care. 2022 Dec;49(4):517-530. doi: 10.1016/j.jpop.2022.04.002. Epub 2022 Apr 25. PMID: 36357058; PMCID: PMC9035352.
- American Medical Association. CARES Act: AMA COVID-19 pandemic telehealth fact sheet [Internet]. American Medical Association. 2020 [cited 2023 Feb 8]. Available from: <https://www.ama-assn.org/delivering-care/public-health/cares-act-ama-covid-19-pandemic-telehealth-fact-sheet>
- Licensing across state lines <https://telehealth.hhs.gov/licensure/licensing-across-state-lines>
- Cross-State Licensing <https://www.cchpca.org/topic/cross-state-licensing-professional-requirements/>
- NPPES National Plan and Provider Enumeration System. Accessed May 9, 2023. <https://nppes.cms.hhs.gov/#/>
- Connor J, Zheng Y, Houle K, Cox L. Adopting Telehealth During The COVID-19 Era: The Urologist's Perspective. Urology. 2021;156:289-295. doi:10.1016/j.urology.2021.03.051
- Fox-Fuller JT, Rizer S, Andersen SL, Sunderaraman P. Survey Findings About the Experiences, Challenges, and Practical Advice/Solutions Regarding Teleneuropsychological Assessment in Adults. Arch Clin Neuropsychol. 2022;37(2):274-291. doi:10.1093/arclin/acab076
- KLAS-report-vendor-performance-in-response-to-the-covid-19-crisis-brief.pdf. Google Docs. Accessed June 6, 2023. https://drive.google.com/file/d/1L_ea2V68uFaodQOGJcGVOK3nCQDAYI/view