

Equity in access to outpatient rehabilitation services for children
with traumatic brain injury and public insurance

Molly M. Fuentes

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Committee:

Frederick P. Rivara

Ali Rowhani-Rahbar

Susan D. Apkon

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Abstract

Objective: Identify insurance-based disparities in access to outpatient rehabilitation services for children.

Design: Audit study using paired telephone calls by callers posing as mother of a child with history of severe traumatic brain injury (TBI) seeking outpatient rehabilitation services.

Setting: Outpatient rehabilitation service clinics in Washington State

Participants: 195 Physical Therapy (PT), 109 Occupational Therapy (OT), 102 Speech Therapy (ST) and 11 Rehabilitation Medicine clinics

Interventions: None

Main outcome measures: Acceptance of public insurance and wait time in work days until the next available appointment.

Results: Therapy clinics were more likely to accept private versus public insurance (incidence rate ratio (IRR) for PT 1.33 (95% confidence interval (CI) 1.22-1.44), for OT 1.40 (95% CI 1.24-1.57), and for ST 1.42 (95% CI 1.25-1.62), but there was no significant difference for Rehabilitation Medicine clinics (IRR 1.10, 95% CI 0.90-1.34). The difference in median wait time between clinics that accepted public versus only private insurance was 4 business days for PT and 15 days for PT ($p \leq .001$) but not significantly different for OT or Rehabilitation Medicine. When adjusting for urban and multidisciplinary status, the wait at clinics accepting public insurance was 59% longer for PT (95% CI 39-81%), 18% longer for OT (95% CI 7-30%) and 107% longer for ST (95% CI 87-130%) than at clinics accepting only private insurance.

Conclusion: There are insurance-based disparities in access to outpatient rehabilitation services. Therapy clinics offering services for children with TBI were less likely to offer appointments for callers with public versus private insurance. Therapy clinics accepting public insurance had longer wait times than clinics that accepted only private insurance.

Traumatic brain injury (TBI) is a leading cause of acquired disability in children, accounting for more than 35,000 hospitalizations in the United States each year.¹ In a study using national data from the Healthcare Cost and Utilization Project, 34% of children hospitalized for TBI have publicly funded insurance.² A multicenter prospective cohort study of children hospitalized for TBI found nearly one-third of children had unmet or unrecognized need for healthcare services, with public insurance status associated with higher unmet or unrecognized need at both 3 and 12 months after injury.⁴

Differential access to pediatric outpatient rehabilitation service providers may be a factor in this insurance-based disparity in unmet need. Public insurance is associated with disparities in access to an array of pediatric specialty healthcare services. Children with public insurance in Cook County, Illinois waited on average 22 days longer for a specialty medical appointment than children with private insurance,⁵ with the difference increasing to 40 days longer at clinics associated with academic medical centers.⁶ At one tertiary children's hospital, the time from referral to initial evaluation with an otolaryngologist for sleep disordered breathing was over ten weeks for children with public insurance and under two weeks for children with private insurance.⁷ A study of dermatology providers in 13 markets found 44% of Medicaid-listed providers refused to schedule a new appointment for a child insured by Medicaid; however among clinics that did accept the child with public insurance, there was not a significant difference in wait times by insurance type.⁸

The effect of insurance type on wait times for outpatient rehabilitation services has not been explored, but a recent study of pediatric TBI service providers in Washington state found only 70% of physical or occupational therapy clinics and 80% of speech or cognitive therapy clinics reported accepting public insurance plans.⁹ However, the information on acceptance of

public insurance plans was obtained from the service provider and may not represent what families experience in attempting to schedule outpatient rehabilitation services, it also did not assess wait times. The objective of this study is to use audit methodology (“secret shopper”) to determine if there are insurance-based disparities in access to outpatient rehabilitation services by discipline – Rehabilitation Medicine, Physical Therapy (PT), Occupational Therapy (OT), and Speech Therapy (ST) – for children with TBI, with access measured by insurance type being accepted by the provider and wait time to the next available appointment. Exploratory aims assess the effect of number of therapy disciplines provided by the clinic and the urban status of the clinic on access to outpatient rehabilitation services.

Methods

Study design

This is an audit study in which research team members posed as mothers and made paired calls to outpatient rehabilitation therapy and rehabilitation medicine clinics to determine 1) if the clinic provided services for a simulated child with chronic sequelae from a severe traumatic brain injury, and 2) the wait time until the next available appointment. The calls were guided by a script and separated by three to five weeks. The simulated child for the paired calls varied by insurance status (private insurance versus a Medicaid-managed care plan), age and gender (eight-year-old girl versus nine-year-old boy), and time since injury (nine versus ten months), with the same mechanism of injury (motor vehicle collision), and functional impairments (described further below). This study was conducted in Washington State, with a 2014 population of 7,061,530,¹⁰ 23% of whom are under 18-years-old¹¹ and 10% living in rural areas.¹⁰ Forty-two

percent of children in Washington State are publicly insured,¹² with nearly all of these children served by Medicaid managed care plans.

Sampling methods

Because several providers may practice at the same clinic, clinics – defined as having unique telephone numbers for scheduling appointments – rather than providers were sampled. The sample of PT, OT, and ST clinics was generated from a number of sources: (1) marketing list of licensed physical, occupational, or speech therapists; (2) lists of community therapy clinics and county-specific therapy resources for children with special healthcare needs maintained by the tertiary children’s hospital serving the state; (3) list of pediatric service providers from the Brain Injury Alliance of Washington; and (4) to mimic what a family may experience when trying to find pediatric therapy services, a Google Maps-based search using the search terms “pediatric physical therapy”, “pediatric occupational therapy” and “pediatric speech therapy”. If during the calling process the scheduler referred us to a clinic that was not already in the sample, the referral clinic was included in the sample. All clinics identified by the children’s hospital were included in the sample. Therapists or clinics identified by the marketing list and Google search were included if they had a website that listed neurological rehabilitation as a provided service, included brain injury as a condition treated at the clinic, or if the clinic treated children. Therapy clinics were excluded if they provided only home health therapies, were early intervention centers exclusively treating children under the age of 3, had an exclusive focus on musculoskeletal or sports therapy, provided only specialized treatments (such as augmentative and alternative communication or hand therapy) that would be not be clinically appropriate for

the simulated child's needs, or if the therapy clinic was part of a health care system with a separate pediatric-specific therapy clinic in the same building or complex.

The sample of Rehabilitation Medicine clinics was generated from four sources. Publicly-available search tools from the American Board of Physical Medicine and Rehabilitation and the American Academy of Physical Medicine were used to identify Rehabilitation Medicine physicians (physiatrists) in Washington State who are board-certified and/or members of a national specialty organization for physiatrists. The provider/clinic search features for each major health care system in the state and the insurance plans used for the study were queried to identify providers specializing in Rehabilitation Medicine, Physical Medicine and Rehabilitation, or Physiatry. This list of physiatrists was then screened to include those whose practice included pediatric rehabilitation, neurological rehabilitation, or general rehabilitation; those who practice focused on musculoskeletal rehabilitation or electrodiagnostic testing were excluded. The telephone number used to schedule appointments for the physiatrist was used to identify the sample of unique Rehabilitation Medicine clinics.

Clinical scenario and protocol

The clinical scenario was crafted such that a child with the functional impairments described would benefit from outpatient rehabilitation therapies and the oversight of a physiatrist. The scripts described a child with balance difficulties, impaired use of her dominant right arm, and memory and organizational impairments. For the calls to therapy clinics, the caller reported having a therapy referral from a provider at the Seattle Children's Hospital Rehabilitation Medicine clinic. In case the therapy clinics requested clinical documentation, mock clinic notes and therapy referrals were created; the caller read this documentation to the

clinic scheduler as necessary. If the clinic scheduler asked a question not directly covered by the script or clinical scenario, standardized “work-arounds” were developed to maintain the integrity of the calls.

Clinics were deemed “out of scope” if they reported they did not provide care for traumatic brain injury or for children the age of the simulated patient. All calls were made from study cellular telephones with an area code corresponding to the non-Seattle area of Western Washington. If someone at the clinic did not answer the telephone, they were called at different times of the day on different days of the week prior to the simulated parent leaving a voice-mail message with their name, simulated child’s name, reason for needing services, and insurance type. Two study email profiles were created to enable communication with clinics that requested electronic communication.

The order of reported insurance type, and age/gender of the simulated patient was randomly assigned for each clinic using a random number generator to first determine insurance type and then age/gender. If the caller was not asked about insurance, the caller confirmed the clinic accepted their insurance. The goal of each call was to determine if the insurance type was accepted and the date of the next available appointment; no actual appointments were scheduled and the calls were ended as soon as possible without arousing suspicion once the information was obtained. The outcomes for this study are the percentage of clinics that accept the Medicaid managed care plan (hereafter referred to as public insurance) and the number of work days between the call and the next available appointment date. Covariates collected were the urban status and number of services offered at the clinic. The urban status of each clinic was based on the county’s Urban Influence Code and classified as being in a large metropolitan (“metro”) area, defined as having an urban core greater than one million people, or a small/non-metro area,

defined as having an urban core less than one million people. Therapy clinics were classified as single discipline if only one therapy service was provided or multidisciplinary if two or more therapy services were offered. All the Rehabilitation Medicine clinics were single discipline.

Study oversight

The University of Washington Human Subjects Division determined this study did not meet the regulatory definition of human subjects research as the unit of analysis is a clinic and not a person. A research bioethics consultation at Seattle Children's Research Institute was obtained to understand the ethical implications of using deception to assess the impact of insurance type on access to outpatient rehabilitation services. Deception was considered essential to accomplish the objective of the study – ascertaining insurance-based disparities in children's access to outpatient rehabilitation services by measuring the real-life behavior of clinics contacted for outpatient appointments. Based on the discussion with the research bioethicists, a letter was sent to each clinic in the sample prior to calling the clinic, indicating their clinic may be contacted to find out waiting times for appointments; contact information was included if there were questions about the study. Two clinics responded to the letter stating they did not see children with traumatic brain injury and they were removed from the sample.

Statistical analysis

Descriptive statistics were used to characterize the clinic population and the acceptance of insurance based on clinic characteristics. The proportion of clinics offering an appointment when the caller had private insurance was compared to the proportion offering appointments when the caller had public insurance using generalized linear models with a log link and Poisson

family with clustering by clinic to account for repeated measures from the paired calls. This analysis was repeated with stratifications by number of services offered and urban status of the clinic.

The measure for wait time was the count of work days until the next available appointment, which had a non-normal distribution, thus median wait time was described rather than average wait time. For clinics that accepted both insurance types, or offered appointments to callers with both types of insurance, the median number of work days until the next available appointment when the caller had public insurance was compared with the wait with private insurance using the Wilcoxon Signed Rank Test. The difference in median wait time when the caller had public insurance at therapy clinics accepting both public and private insurance was compared to the wait time at clinics accepting only private insurance using the Wilcoxon rank-sum on median difference test. A multivariate generalized linear model using Poisson family and log link for wait times in work days until an appointment was used to assess the influence of insurance types accepted, urban status, and number of services offered at the clinic on wait time for each therapy discipline. The results of this model are interpreted as the factor by which the count of work days is greater for calls with public insurance compared to private insurance. Because only one Rehabilitation Medicine clinic did not accept public insurance and only one ST clinic did not accept private insurance, Rehabilitation Medicine clinics and clinics that did not accept private insurance were excluded from analyses comparing wait times based on type of insurance accepted by the center.

Statistical significance was set at $P < .05$. Stata 12 software was used for data analysis.

Results

Paired calls to 284 outpatient rehabilitation clinics gathered data on 195 PT clinics, 109 OT clinics, 102 ST clinics, and 11 Rehabilitation Medicine clinics (Figure 1). Most of the PT clinics were single discipline (60.0% versus 40% in multidisciplinary centers) and located in small or non-metropolitan areas (59.0% compared to 41.0% in large metropolitan areas). The OT clinics were predominantly multidisciplinary (74.3% compared to 25.7% single discipline clinics) and located in small or non-metropolitan areas (55% versus 45% in large metropolitan areas). The majority of ST clinics were also multidisciplinary (56.9% compared to 43.1% single discipline ST) but unlike the other therapy services, ST clinics were more likely to be in large metropolitan areas (52.9% versus 47.1% in small or non-metropolitan areas). Six of the 11, or 54.6% of the Rehabilitation Medicine clinics were in large metropolitan areas. (Table 1)

Insurance Acceptance

Overall, 147 (75.4%) of PT clinics, 78 (71.6%) of OT clinics, 71 (69.6%) of ST clinics and 10 (90.9%) of Rehabilitation Medicine clinics accepted public insurance. Clinics in the three therapy disciplines were 33-43% more likely to offer appointments when the simulated child had private insurance than when the insurance type was public insurance (incidence rate ratio (IRR): PT, 1.33, 95% confidence interval (CI) 1.22-1.44; OT, 1.40, 95% CI 1.24-1.57; ST, 1.42 95% CI 1.25-1.62) while there was no difference for Rehabilitation Medicine clinics (IRR 1.10, 95% CI 0.90-1.34). (Table 2)

Multidisciplinary therapy clinics were more likely than single discipline clinics to accept public insurance, but were still 14-24% more likely to offer an appointment when the caller had private insurance versus public insurance. Less than half of single discipline OT and ST clinics

offered an appointment when the caller had public insurance and were twice as likely to offer an appointment to a caller with private compared to public insurance (OT IRR 2.33, 95% CI 1.51-3.61; ST IRR 2.10, 95% CI 1.53-2.86). Urban status also affected the proportion of clinics accepting public insurance. Therapy clinics in large metropolitan areas were 51-93% more likely to offer an appointment to a caller with private insurance compared to callers with public insurance (IRRs: PT, 1.51, 95% CI 1.29-1.77; OT, 1.88, 95% CI 1.44-2.46; ST, 1.93 95% CI 1.49-2.50). (Table 2)

Wait Times for Rehabilitation Services

At clinics that accept both public insurance and private insurance, the median wait time for an appointment varied by insurance status and type of therapy clinic. The median wait for a PT appointment when calling with public insurance was 7.0 work days (interquartile range (IQR) 3-14) versus 5.0 work days (IQR 2-12) when calling with private insurance ($P<.001$). For an OT appointment, the median wait with public insurance was 12.5 work days (IQR 6-30) compared to 11.0 work days (IQR 5-23) ($P<.001$) with private insurance. The median wait time for a ST appointment was 20.0 work days (IQR 9-44) with public insurance and 15.0 work days (IQR 5-40) with private insurance ($P<.001$). The median wait for both insurance types was 13.0 work days (IQR 9-44) for a Rehabilitation Medicine appointment. The median wait was longer at clinics in large metropolitan areas for all disciplines except PT, with the wait with public insurance consistently longer than the wait with private insurance. (Table 3) When examining the distribution of difference in wait times for callers with public versus private insurance within the same clinic, most clinics had no difference in wait time (0 days, IQR 0-1), but at some clinics, the wait with public insurance was several months longer. (Figure 2)

When comparing the median wait time at clinics that accept public insurance to the wait at clinics that accept only private insurance, there were statistically significant differences for PT and ST clinics, but not OT clinics (Table 4). PT clinics that accepted public insurance had a median wait time of 7 work days (IQR 3-14) compared to 3 work days (IQR 1-6.5) at clinics accepting only private insurance ($P<.0001$). ST clinics that accepted public insurance had a median wait time of 20 work days (IQR 9-41) compared to 5 work days (IQR 2-20) at ST centers accepting only private insurance ($P=.0006$). Stratifying by urban status revealed different effects on wait time for the various disciplines. There was no significant difference in median wait time for PT appointments between centers that accept public insurance and those that accept only private insurance in large metropolitan areas. OT clinics in large metropolitan areas accepting public insurance had a median wait time of 20 work days (IQR 10-40) compared to 5 work days (IQR 3-24) at OT clinics accepting only private insurance ($P=.0182$). The wait at ST clinics accepting public insurance in large metropolitan areas was 38.5 work days (IQR 7.5-62.5) compared to only 5 work days (IQR 4-20) among those accepting only private insurance ($P=.0059$), a difference of over 6 weeks. In small metropolitan or non-metropolitan areas, there was a larger difference in median wait times for PT appointments at clinics that accept public insurance compared to those accepting only private insurance (9 (IQR 4-14) versus 3 (IQR 1-7) work days, $P<.0001$). There were no significant differences in median wait times at OT or ST clinics accepting public insurance and clinics accepting only private insurance in small metropolitan and non-metropolitan areas. (Table 4)

Multivariate analysis

When adjusting for urban and multidisciplinary status, the wait until the next available appointment was 59% longer (adjusted incidence rate ratio (aIRR) 1.59, 95% CI 1.39-1.81) for PT and 107% longer for ST appointments (aIRR 2.07, 95% CI 1.87-2.30) at clinics accepting public insurance compared to clinics accepting only private insurance. Urban status remained statistically significant for OT and ST clinics when adjusting for insurance types accepted and multidisciplinary nature. OT clinics in small metropolitan or non-metropolitan areas had a 21% longer wait time than those in large metropolitan areas (aIRR 1.21, 95% CI 1.12-1.32). Conversely, ST clinics in small metropolitan or non-metropolitan areas had wait time 29% shorter than clinics in large metropolitan areas (aIRR 0.71, 95% CI 0.66-0.77). Physical Therapy and ST clinics within multidisciplinary centers have significantly longer wait times when adjusting for insurance type accepted and urban status. Multidisciplinary PT clinics have a wait time 2.2 times longer than single discipline PT clinics (aIRR 3.18, 95% 2.88-3.51) and multidisciplinary ST clinics have a wait time 64% longer than single discipline ST clinics (aIRR 1.64, 95% CI 1.51-1.79).

Discussion

This study used audit methodology to simulate the real-world experience of families attempting to obtain outpatient rehabilitation services for children with a history of TBI in Washington State. Based on the results of this study, children with TBI covered by public insurance will be less likely to receive an appointment and will have to wait longer for rehabilitation therapy services than a child with private insurance, but there were no insurance-based differences among Rehabilitation Medicine clinics that treat children with TBI. Between 25% and 30% of therapy clinics denied appointments when the caller had public insurance.

Therapy clinics that accept public insurance have median wait times 4 to 15 work days longer than clinics that accept only private insurance; and at clinics that accept both public and private insurance, the median wait for callers with public insurance was an additional 1.5 to 5 days longer than for callers with private insurance. When controlling for urban and multidisciplinary clinic status, the number of days until the next available appointment was 59% greater for PT, 18% greater for OT and 107% greater for ST at clinics that accepted public insurance compared to clinics that accepted only private insurance.

The proportion of outpatient rehabilitation clinics accepting public insurance in this study is higher than in other audit-based studies of access to pediatric health care. While only 34% of specialty medical providers in Cook County, Illinois⁵ and 19% of dermatologists⁸ offered appointments for children with public insurance, 90% of Rehabilitation Medicine, 75% of PT, 72% of OT, and 70% of ST clinics accepted public insurance in this study. The ecological analyses by Moore et al. that found a similar proportion of PT and OT clinics accepting public insurance (70%), but a slightly higher percentage (80% versus 70% in this study) of ST and cognitive therapy clinics accepting public insurance; the rehabilitation clinics in that study formed a subset of the clinics in this study.⁹

This study's 1.5 to 5 day difference in median wait time for an appointment with public versus private insurance at therapy clinics accepting both insurance types was of a lower magnitude than other studies examining insurance-based disparities in wait times, which found average wait time differences for children with public insurance of 22 days to 8 weeks at medical clinics accepting both public and private insurance.⁵⁻⁷ However, these studies did not examine wait times at clinics which denied public insurance and thus are not accessible to children with public insurance. In this study, the difference in median wait time between clinics accepting

public insurance and those denying public insurance was 4 work days for PT clinics and 15 work days (or 3 weeks) for ST clinics. The other studies did not include analyses comparing access based on urban status. In this study, clinics in large metropolitan areas had greater disparities in the proportion of therapy clinics accepting public insurance than those in small and non-metropolitan areas. Among clinics in large metropolitan areas, OT clinics accepting public insurance had a 3 week longer wait time and ST clinics accepting public insurance had waits over 6 weeks longer than clinics accepting only private insurance.

This study was not designed to compare differences in access between rehabilitation disciplines, but in general ST clinics had the lowest percentage accepting public insurance and the largest difference in wait times based on insurance status among the therapy disciplines studied. This is concerning, as a prior study found that for children 12 months after TBI, there was greater need for cognitive health services – such as would be provided by ST – than physical or socioemotional services.⁴ Thus, the rehabilitation therapy discipline that may be in greatest demand has the most striking insurance-based disparities in access.

While there have been numerous studies on factors, including factors other than reimbursement rates, that influence Medicaid acceptance among medical providers,^{13,14} there is no equivalent data among rehabilitation therapy providers available yet. A recent study found physicians with a higher proportion of Medicaid patients had characteristics associated with perceived lower quality such as lower probability of board certification.¹⁵ There is no measure of quality of service provided by the clinics in this sample; simply because the clinic would see a child with sequela of TBI or even if the clinic specializes in pediatric neuro-rehabilitation does not mean that clinic will meet the child's needs. It is possible that rehabilitation clinics perceived to offer high quality services may have differences in access. Future steps could examine factors

influencing acceptance of public insurance among outpatient rehabilitation clinics, including provider and clinic characteristics and perceived quality of services.

Study limitations

This study's results may not represent access to outpatient rehabilitation services in other regions or states, particularly states which did not opt to expand Medicaid under the Affordable Care Act. This study only examined access to outpatient rehabilitation services for children with chronic sequela of TBI, with a clinical scenario specifically designed to represent a child who needed outpatient rehabilitation services, but did not have needs so specialized that clinics may not be able to provide appropriate services. Access and wait times may be different for children with more acute needs, such as those discharging from inpatient rehabilitation units; however, outpatient rehabilitation is often arranged for the family prior to a child's discharge from inpatient rehabilitation. This study did not use audit-methodology techniques to assess differences in access for children with public insurance with language barriers; less than 50% of outpatient therapy clinics sampled in a previous study accepted Medicaid and reported (in a research and not audit setting) the clinic offered interpretation services for children who spoke languages other than English.⁹ It is possible that a parent needing interpretation services who called attempting to schedule a therapy appointment might face additional access barriers. Excluding rehabilitation clinics that focused on musculoskeletal impairments might have caused the study to overlook ways a child might access rehabilitation services; however, the study team felt that clinically, a child with TBI would be best served by clinics with at least a degree of specialization in pediatric or neurological rehabilitation. Finally, multiple callers collected this data, though all were trained by the same individual (L.T.).

Conclusions

Outpatient rehabilitation therapy clinics offering services for children with TBI were less likely to offer appointments and had longer wait times until the next available appointment for callers with public insurance compared to private insurance. Additionally, outpatient rehabilitation clinics that accepted both public and private insurance had longer wait times than clinics that accepted only private insurance. Further work to characterize factors influencing access to rehabilitation services for children with public insurance and to mitigate insurance-based disparities in access to outpatient rehabilitation services is essential.

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Figure 1: Clinics included in study sample

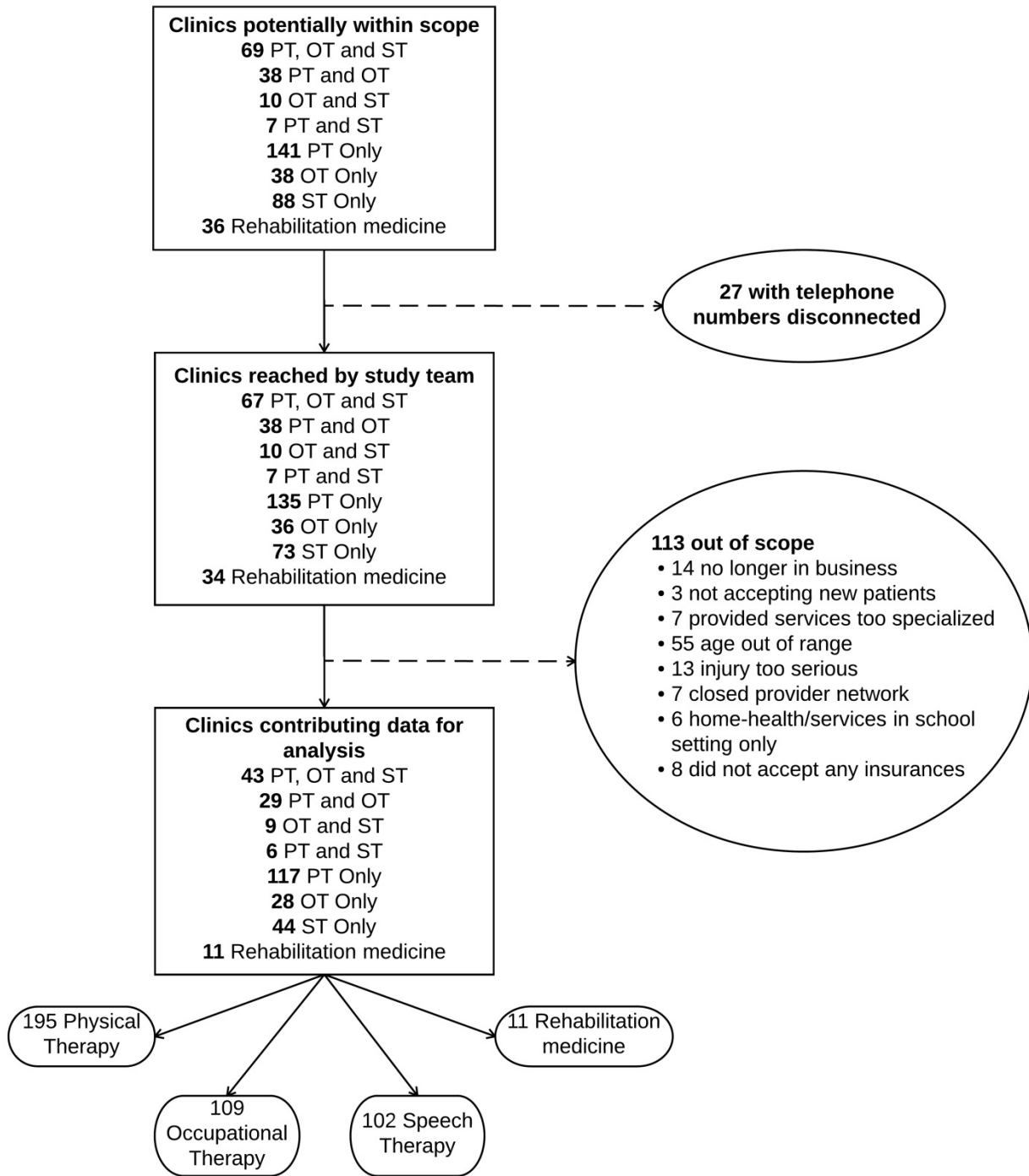


Table 1. Characteristics of outpatient rehabilitation clinics.

| | <u>Rehabilitation Medicine</u> | <u>Physical Therapy</u> | <u>Occupational Therapy</u> | <u>Speech Therapy</u> |
|------------------------------|------------------------------------|-----------------------------|---------------------------------|---------------------------|
| Variables | (N=11) | (N=195) | (N=109) | (N=102) |
| Number of disciplines | | | | |
| Single discipline | 11 (100.0) | 117 (60.0) | 28 (25.7) | 44 (43.1) |
| Multidisciplinary | 0 (0.0) | 78 (40.0) | 81 (74.3) | 58 (56.9) |
| Urban Status | | | | |
| Large metropolitan area | 6 (54.6) | 80 (41.0) | 49 (45.0) | 54 (52.9) |
| Small / non-metro area | 5 (45.4) | 115 (59.0) | 60 (55.0) | 48 (47.1) |

Note. Values presented as N (column %).

Table 2. Likelihood of being offered an outpatient rehabilitation appointment according to insurance type

| | Offered appointment with private insurance | Offered appointment with public insurance | Incidence Rate Ratio [95% CI] |
|------------------------------|--|---|-------------------------------|
| | N(%) | | |
| All clinics | | | |
| PT (n=195) | 195 (100.0) | 147 (75.4) | 1.33 [1.22-1.44] |
| OT (n=109) | 109 (100.0) | 78 (71.6) | 1.40 [1.24-1.57] |
| ST (n=102) | 101 (99.0) | 71 (69.6) | 1.42 [1.25-1.62] |
| Rehab Med (n=11) | 11 (100.0) | 10 (90.9) | 1.10 [0.90-1.34] |
| Number of Disciplines | | | |
| <i>Single Discipline</i> | | | |
| PT (n=117) | 117 (100.0) | 84 (71.8) | 1.39 [1.24-1.56] |
| OT (n=28) | 28 (100.0) | 12 (42.9) | 2.33 [1.51-3.61] |
| ST (n=44) | 44 (100.0) | 21 (47.8) | 2.10 [1.53-2.86] |
| <i>Multidisciplinary</i> | | | |
| PT (n=78) | 78 (100.0) | 63 (80.8) | 1.24 [1.11-1.38] |
| OT (n=81) | 81 (100.0) | 68 (84.0) | 1.23 [1.11-1.36] |
| ST (n=58) | 57 (98.3) | 49 (84.5) | 1.14 [1.02-1.27] |
| Urban Status | | | |
| <i>Large metro</i> | | | |
| PT (n=80) | 80 (100.0) | 53 (66.3) | 1.51 [1.29-1.77] |
| OT (n=49) | 49 (100.0) | 26 (53.1) | 1.88 [1.44-2.46] |
| ST (n=54) | 54 (100.0) | 28 (51.9) | 1.93 [1.49-2.50] |
| Rehab Med (n=6) | 6 (100.0) | 5 (83.3) | 1.20 [0.81-1.78] |
| <i>Small metro/Non-metro</i> | | | |
| PT (n=115) | 115 (100.0) | 94 (81.7) | 1.22 [1.12-1.33] |
| OT (n=60) | 60 (100.0) | 52 (86.7) | 1.15 [1.04-1.28] |
| ST (n=48) | 47 (97.9) | 43 (89.6) | 1.09 [0.98-1.22] |
| Rehab Med (n=5) | 5 (100.0) | 5 (100.0) | -- |

Note. Incidence rate ratio in this model compares proportion of clinics offering an appointment when the caller had private insurance versus public insurance.

Abbreviations: CI, Confidence interval; PT, Physical Therapy; OT, Occupational Therapy; ST, Speech Therapy; Rehab Med, Rehabilitation Medicine

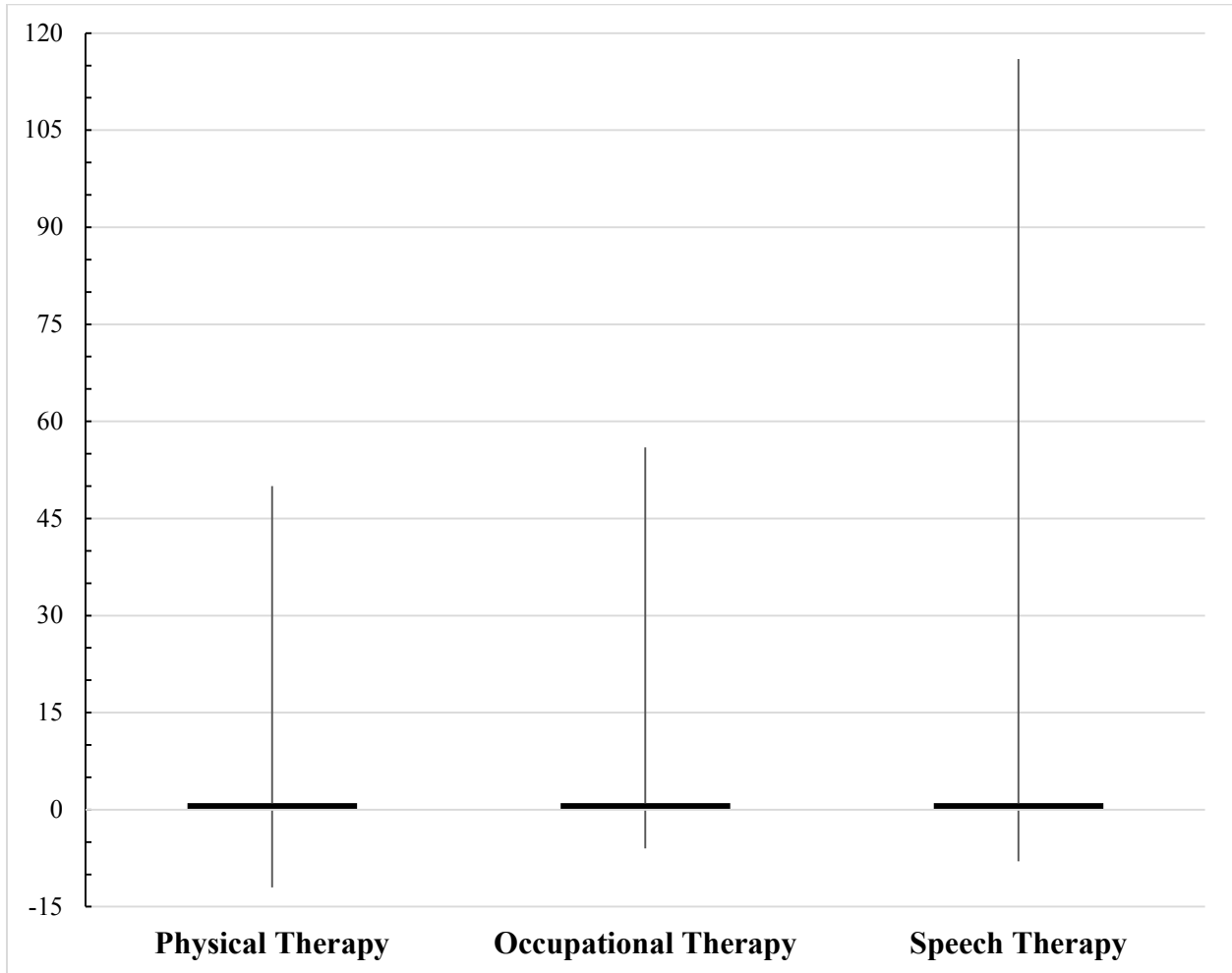
Table 3. Differences in wait times at centers according to patient insurance type, stratified by size of metropolitan area, among clinics that accept both public and private insurance

| | No. of clinics accepting both insurance types | Public Insurance wait time, in work days | Private Insurance Wait time, in work days | P ¹ |
|---|---|--|---|----------------|
| All areas | | Median (IQR) | Median (IQR) | |
| PT | 147 | 7.0 (3-14) | 5.0 (2-12) | <.001 |
| OT | 78 | 12.5 (6-30) | 11.0 (5-23) | <.001 |
| ST | 70 | 20.0 (9-41) | 15.0 (5-40) | <.001 |
| Rehab Med | 10 | 13.0 (9-44) | 13.0 (9-44) | 1.00 |
| Large Metropolitan Area | | | | |
| PT | 53 | 4.0 (2-10) | 3.0 (1-10) | .048 |
| OT | 26 | 20.0 (10-40) | 17.5 (10-30) | .021 |
| ST | 28 | 38.5 (7.5-62.5) | 16.0 (5-40) | .008 |
| Rehab Med | 5 | 38.0 (9-50) | 38.0 (9-50) | 1.00 |
| Small Metropolitan or Non-Metropolitan Area | | | | |
| PT | 94 | 9.0 (4-14) | 7.0 (3-12) | .003 |
| OT | 52 | 10.0 (5.5-20) | 10.0 (3.5-20) | .007 |
| ST | 42 | 18.5 (9-40) | 15 (7-40) | .008 |
| Rehab Med | 5 | 11 (10-15) | 11 (10-15) | 1.00 |

Note. ¹significance based on Wilcoxon Signed Rank Test

Abbreviations: IQR, Interquartile Range; PT, Physical Therapy; OT, Occupational Therapy; ST, Speech Therapy, Rehab Med, Rehabilitation Medicine

Figure 2. Distribution of the differences in wait time, in work days, between public and private insurance at individual clinics accepting both insurance types



Note. The difference in wait time at individual clinics was calculated by subtracting the number of work days until the next appointment for the caller with private insurance from the number of work days until the next appointment for the caller with public insurance. The median for all three disciplines was 0, with an interquartile range of 0-1. The minimum value for PT was -12, for OT -6 and for ST -8. The maximum value, or the greatest number of work days difference for public versus private insurance was 50 for PT, 55 for OT and 115 for ST.

Table 4. Differences in wait times according to clinic acceptance of public insurance, stratified by size of metropolitan area.

| Work Days (Median, IQR) | Physical Therapy | | | Occupational Therapy | | | Speech Therapy | | |
|---|--------------------------|--------------------------------|------------------------------|--------------------------|--------------------------------|------------------------------|--------------------------|--------------------------------|------------------------------|
| | Accepts public insurance | Accepts only private insurance | <i>P</i> -value ^B | Accepts public insurance | Accepts only private insurance | <i>P</i> -value ^B | Accepts public insurance | Accepts only private insurance | <i>P</i> -value ^B |
| All Clinics | | | | | | | | | |
| | N=147 | N=48 | | N=78 | N=31 | | N=70 | N=31 | |
| | 7 (3,14) | 3 (1,6.5) | <.0001 | 12.5 (6,30) | 5 (4,25) | .0584 | 20 (9,41) | 5 (2,20) | .0006 |
| Clinics in Large Metropolitan Areas | | | | | | | | | |
| | N=53 | N=27 | | N=26 | N=23 | | N=28 | N=26 | |
| | 4 (2,10) | 3 (1,5) | .2239 | 20 (10,40) | 5 (3,24) | .0182 | 38.5 (7.5, 62.5) | 5 (4,20) | P=.0059 |
| Clinics in Small Metropolitan or Non-Metropolitan Areas | | | | | | | | | |
| | N=94 | N=21 | | N=52 | N=8 | | N=42 | N=5 | |
| | 9 (4,14) | 3 (1,7) | <.0001 | 10 (5.5,20) | 11 (5,43.5) | .9216 | 18.5 (9,40) | 5 (2,5) | P=.0643 |

Notes. Wait at centers that accept both public and private insurance is the wait time in work days for a child with public insurance.^B

Wilcoxon rank-sum on median difference.

Abbreviations: IQR, interquartile range

Table 5. Poisson regression for work days to appointment at clinics accepting both insurance types relative to clinics accepting only private insurance, with adjustment for urban status and multidisciplinary services

| | Physical Therapy | | | Occupational Therapy | | | Speech Therapy | | |
|--------------------------------|------------------|------------|-----------------|----------------------|------------|-----------------|----------------|------------|-----------------|
| | aIRR | 95% CI | <i>P</i> -value | aIRR | 95% CI | <i>P</i> -value | aIRR | 95% CI | <i>P</i> -value |
| Accepts Private Insurance Only | 1 | -ref- | -ref- | 1.0 | -ref- | -ref- | 1.0 | -ref- | -ref- |
| Accepts Both Insurances | 1.59 | 1.39, 1.81 | <0.001 | 1.18 | 1.07, 1.30 | 0.001 | 2.07 | 1.87, 2.30 | <0.001 |
| Large Metro Area | 1 | -ref- | -ref- | 1.0 | -ref- | -ref- | 1.0 | -ref- | -ref- |
| Small/Non-Metro Area | 1.00 | 0.91, 1.11 | 0.930 | 1.21 | 1.12, 1.32 | <0.001 | 0.71 | 0.66, 0.77 | <0.001 |
| Single Discipline | 1 | -ref- | -ref- | 1.0 | -ref- | -ref- | 1.0 | -ref- | -ref- |
| Multiple Disciplines | 3.18 | 2.88, 3.51 | <0.001 | 0.96 | 0.87, 1.05 | 0.346 | 1.64 | 1.51, 1.79 | <0.001 |

Note. In this model, incidence rate ratio can be interpreted as the factor by which the count of work days is greater for calls with public insurance compared to private insurance. For instance, if a multidisciplinary ST clinic in a large metropolitan area that only accepted private insurance had a wait time of 5 work days, the expected wait time at a multidisciplinary ST clinic in a large metropolitan area that accepted public insurance would 5 x 2.07, or 10.35 work days.

Abbreviations: aIRR, adjusted incidence rate ratio; CI, confidence interval