

Telemedicine Access and Utilization among Pediatric Medicaid Beneficiaries with Behavioral Health and Musculoskeletal Conditions

Data Brief | January 2022

HIGHLIGHTS FOR PEDIATRIC BENEFICIARIES APRIL 2020 – MARCH 2021

- For children enrolled in NC Medicaid and accessing care pre-COVID-19, more than a third (37%) in a behavioral health (BH) cohort and 4% in a musculoskeletal (MSK) cohort used telemedicine for their condition-specific services during COVID-19.
- Without adjusting for other factors, telemedicine use in both the BH and MSK pediatric cohorts generally did not meaningfully vary across sex, race, ethnicity, and rurality.
- Audio-only use was more common among 18-20-year-olds in both the BH and MSK cohorts.
- Condition-specific service utilization did not change much for telemedicine users in both cohorts during the pandemic. In contrast, for non-telemedicine users in both cohorts, there was a large decrease in condition-specific service utilization during the pandemic.

Executive Summary

This data brief, developed by researchers at the Duke-Margolis Center for Health Policy and collaborators, describes recent patterns of access to care and telemedicine use among pediatric Medicaid beneficiaries in North Carolina with behavioral health (BH) and musculoskeletal (MSK) conditions. The research team analyzed NC Medicaid claims data from March 2019 through March 2021 to determine whether telemedicine helped mitigate or exacerbate disparities in access to care. The research findings, based on descriptive statistics, were supplemented with both BH and MSK providers' perspectives on telemedicine access and challenges, and their recommendations to support equitable access to care. The study's goal was to provide policy makers with insights that can be used to improve future telemedicine coverage and payment policies and help improve the well-being of pediatric Medicaid beneficiaries in North Carolina. The study revealed the following:

- Although overall health care utilization dropped during the COVID-19 pandemic, telemedicine generally supported continuity of care for pediatric beneficiaries with both BH and MSK conditions.
- Importantly, telemedicine users during the pandemic also exhibited greater service use pre-COVID, suggesting that telemedicine supported continuous access and adherence to care among those who also had access.
- There was a greater utilization of telemedicine among pediatric beneficiaries with BH conditions (37%) compared to pediatric beneficiaries with MSK conditions (4%). These results illustrate that BH care transitioned more readily to telemedicine during the pandemic compared to other aspects of health care.
- The overwhelming majority (94%) of MSK pediatric beneficiaries using telemedicine had acute conditions. By contrast, a somewhat lower percentage (73%) of non-telemedicine users had acute conditions. The majority of both MSK telemedicine and non-telemedicine users live in urban areas (79% of users, and 73% of non-users).
- Of the pediatric BH and MSK beneficiaries using telemedicine, most used video services rather than audio-only services. Audio-only use was more common among older adolescents.
- Non-telemedicine users – people who did not have phone-based audio visits, or employ digital technologies to access care – exhibited a dramatic reduction in service use during COVID-19 (April 2020-March 2021). Of those using condition-specific services before the pandemic who did not become telemedicine users, 49% of the BH cohort and 40% of the MSK cohort did not use any condition-specific services during COVID-19.

All data reported from this study are descriptive in nature; no causal inferences or associations can be inferred in their interpretation. The next phase of the research effort will include regression-based modeling that will enable stronger interpretation of the relationship between telemedicine use and patient demographic characteristics, clinical characteristics, and service use.

Study Background and Methods

BH and MSK are prevalent conditions among children and adolescents.^{1,2} About one in six children between the ages of 6 and 17 has a treatable BH condition such as depression and anxiety.² In addition, findings from the National Health Interview Survey reveal that MSK conditions account for about 11% of parent-reported health conditions for children and adolescents aged 0 to 17 years in the United States.³

The expansion of telemedicine during the COVID-19 pandemic presented opportunities to enhance children and adolescent (pediatric) Medicaid beneficiaries' access to BH and MSK services and improve their health outcomes. With a grant from the Kate B. Reynolds Charitable Trust, researchers at the Duke-Margolis Center for Health Policy and collaborators sought to evaluate recent patterns of telemedicine access and utilization among pediatric Medicaid beneficiaries in North Carolina with BH and MSK conditions. We analyzed North Carolina Medicaid member files and professional claims data from 2019-2021.

The study population consisted of two cohorts of pediatric Medicaid beneficiaries ages 0 to 20: children with BH conditions, and children with MSK conditions. Cohort inclusion was not mutually exclusive (i.e., individuals may have been in both cohorts). To be included in each cohort, individuals had to receive a diagnosis and either ≥ 1 inpatient or ≥ 2 outpatient visits related to that condition prior to the COVID-19 pandemic (between March 1, 2019, and February 28, 2020) (Appendix B, Tables A and B). They also had to have continuous enrollment in North Carolina Medicaid through the study period (March 1, 2019 – March 31, 2021). Beneficiaries were excluded if they were older than 20, dually enrolled in Medicare, institutionalized for 100 or more cumulative days during the study period, or had missing county or zip code of residence.

BH diagnosis groups were created based on prevalence of the diagnosed disorders and were not mutually exclusive. MSK conditions groups were categorized based on acute, chronic, or other conditions and are not mutually exclusive.⁴

Beneficiaries were categorized as telemedicine users if they received ≥ 1 BH-or MSK-specific service (Appendix B, Table D and E) via a telemedicine visit during the COVID period (April 1, 2020 – March 31, 2021); telemedicine visits, both video and audio, were identified through specific CPT and modifier codes (Appendix B, Table D and Table E). Audio-only telemedicine visits were identified by modifier CR only, while video telemedicine visits required CR and GT modifiers. NC Medicaid clinical policy refers to audio-only telemedicine visits as telephonic visits. Non-telemedicine users included those who continued to access BH-or MSK-specific care in-person only and those who did not access BH-or MSK-specific care during COVID-19.

BH-specific services were categorized using CPT and ICD-10 CM BH diagnosis codes (Appendix B, Table D). MSK-specific services were categorized using ICD-10 CM MSK diagnosis codes with an eligible provider taxonomy code (Appendix B, Table B). Tailored Plan eligibility⁵ was defined via the Tailored Plan eligibility flag in the member data tables. In the BH cohort, people with waivers or intensive BH use were excluded from the service utilization tables and figures due to dramatic differences in service use. Visits to primary care providers that included an MSK diagnosis were considered MSK visits.

In addition to the data analysis in this study, virtual consultations were conducted with small groups of BH providers (psychotherapists) and MSK providers including physicians, physical, and occupational therapists to gain their perspectives on telemedicine access and challenges, and their recommendations to support equitable access to care. The consultations were conducted by the Duke Clinical & Translational Science Institute (CTSI) Community Engaged Research Initiative (CERI) through its Community Consultation Studios.⁶

Study Results

Behavioral Health (BH) Cohort

Nearly 190,000 children with BH diagnoses and pre-COVID-19 service use were included in the pediatric BH cohort (Table B1). The most common BH conditions in the cohort were neurodevelopmental and related conditions, including learning disabilities, tic and other movement disorders, and other developmental delays (n = 69,819; 37%) and ADHD (n = 67,025; 35%). Less common BH conditions included anxiety and obsessive-compulsive disorders (n = 31,513; 17%), adjustment disorder (n = 30,020; 16%), and disruptive behavior disorders (n = 27,396; 14%) (Table B1). Although opioid use disorder was less common in the pediatric population (n=380), only about 55% of children with this diagnosis who were utilizing care pre-COVID-19 received any BH services during COVID-19 (Table B2).

Conversion to telemedicine: During the COVID-19 pandemic, 68% of the overall group of roughly 190,000 children with BH diagnoses had any BH-specific service use. Of the overall group, 54% had a BH-specific visit that was eligible for telemedicine according to North Carolina Medicaid clinical policy guidelines. The actual share of children in the overall group who had at least one telemedicine visit was 37% (data not shown).

Among the pediatric beneficiaries identified in the BH cohort as telemedicine users, at least half used telemedicine for the majority (75%) of their BH-specific telemedicine-eligible visits. Additionally, a majority of them (75%) did not use any audio-only visits for their BH-specific visits delivered through telemedicine (data not shown).

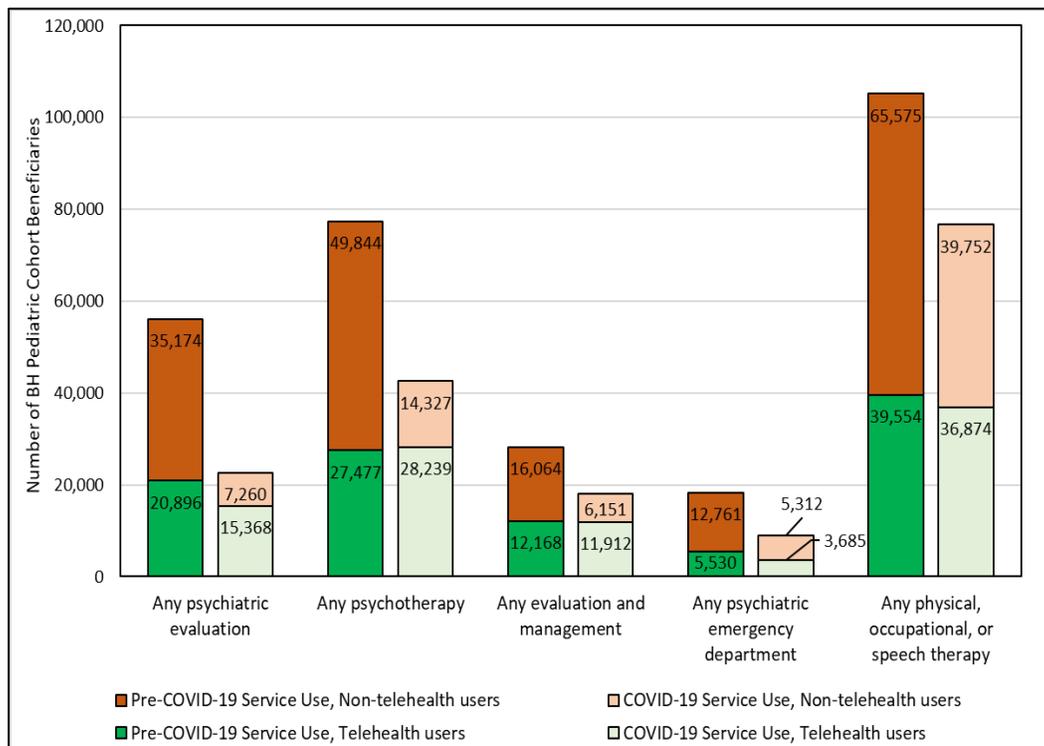
Medicaid eligibility: A higher proportion of children who used telemedicine were eligible (19%) for Medicaid through the blind or disabled eligibility pathways compared to children who did not use telemedicine (12%). About a third of the cohort (31%) were eligible for a Tailored Plan. A higher proportion of telemedicine users (39%) were eligible for a Tailored Plan compared to non-telemedicine users (27%) (Table B1). BH providers agreed that telemedicine addressed many patients' and caregivers' challenges with accessing and using health care services.

Characteristics of telemedicine users: Telemedicine was increasingly used for visits as pediatric beneficiaries got older. Among telemedicine users, beneficiaries ages 18-20 utilized telemedicine for a larger proportion of telemedicine-eligible visits (84%, IQR: 50-100) compared to beneficiaries ages 12-17 (80%, IQR: 47-100), ages 6-11 (80%, IQR: 40-100), or ages ≤5 (61%, IQR: 23-100) (data not shown). While most beneficiaries utilized video services, audio-only use was more common among those ages 18-20 (data not shown). BH providers argued that reimbursement for telemedicine and audio-only services ought to be continued. BH providers particularly noted that audio visits helped address access barriers such as lack of broadband connectivity and transportation. Despite perceived benefits from audio-only visits, BH providers reported being reimbursed at lower rates compared to other telemedicine services.

Without adjusting for other factors, no notable differences existed between telemedicine and non-telemedicine users for sex, race, ethnicity, and county rurality. Pediatric beneficiaries living in rural and urban areas exhibited similar uptake of telemedicine for telemedicine-eligible services (Table B1).

Behavioral health service use: Across almost all BH-specific service types, the number of pediatric beneficiaries that used each type of service declined from pre-COVID-19 to the period during COVID-19 (Figure 1, Table B2). However, a higher proportion of telemedicine users received those services than those who did not use telemedicine during COVID-19 (Table B2). Of note, no pediatric beneficiaries received applied behavior analysis services during COVID-19 (Table B2). Of pediatric beneficiaries who used BH-specific services before COVID-19 and did not become telemedicine users, 49% did not use any BH-specific services during COVID-19 (Table B2).

Figure 1. Changes in Pediatric Behavioral Health Service Use from Pre- to During-COVID-19, by Telemedicine Status



Includes children < 21 as of first day of study period (March 1, 2019).

Telehealth user = At least one BH-related telemedicine visits during COVID-19 (Apr 1 2020 – March 31 2021).

Non-telehealth user = Beneficiaries using in-person BH care only during COVID-19 or those who did not access any BH services during COVID-19.

Neurostimulation and collaborative care services not listed in the figure due to low counts. Refer to Table B2 in the Appendix for those counts.

No pediatric beneficiaries received applied behavior analysis services during COVID-19, and thus it is not listed in the figure.

Excludes pediatric beneficiaries who had a 1915(c) waiver or who had used intensive behavioral health services during the study period.

Musculoskeletal Health (MSK) Cohort

The pediatric MSK cohort included roughly 67,000 individuals who had an MSK diagnosis and accessed at least one MSK service pre-COVID (Table M1). Most of the children in this cohort had a chronic MSK condition (94%), suggesting that telemedicine may have particularly supported continuity of care for those chronic conditions during COVID-19. MSK providers noted that telemedicine improved continuity of care by reducing no-shows to appointments and was of value to patients and families who experienced transportation, mobility, or other access issues. A smaller proportion had acute (14%) or other conditions (8%) (Table M1). Of the total group of roughly 67,000 individuals, only 34% had any MSK-service use during the COVID-19 pandemic (Table M2).

Conversion to telemedicine: While 24% of children had a MSK-specific, telemedicine-eligible visit during the pandemic, only 4% used telemedicine for those MSK-specific services. At least half of this small group used telemedicine for 50% of their MSK-specific, telemedicine-eligible visits (50%, IQR: 20-100). Most did not use audio-only for any of their telemedicine visits (data not shown).

Medicaid eligibility: A higher proportion of those who used telemedicine (<38%) in the cohort were eligible for Medicaid due to being blind or having a disability compared to non-telemedicine users (<10%) (Table M1). About 16% of the cohort were eligible for a Tailored Plan, with higher proportions of people eligible for Tailored Plans among telemedicine (38%) users compared to those who did not use telemedicine (15%) (Table M1).

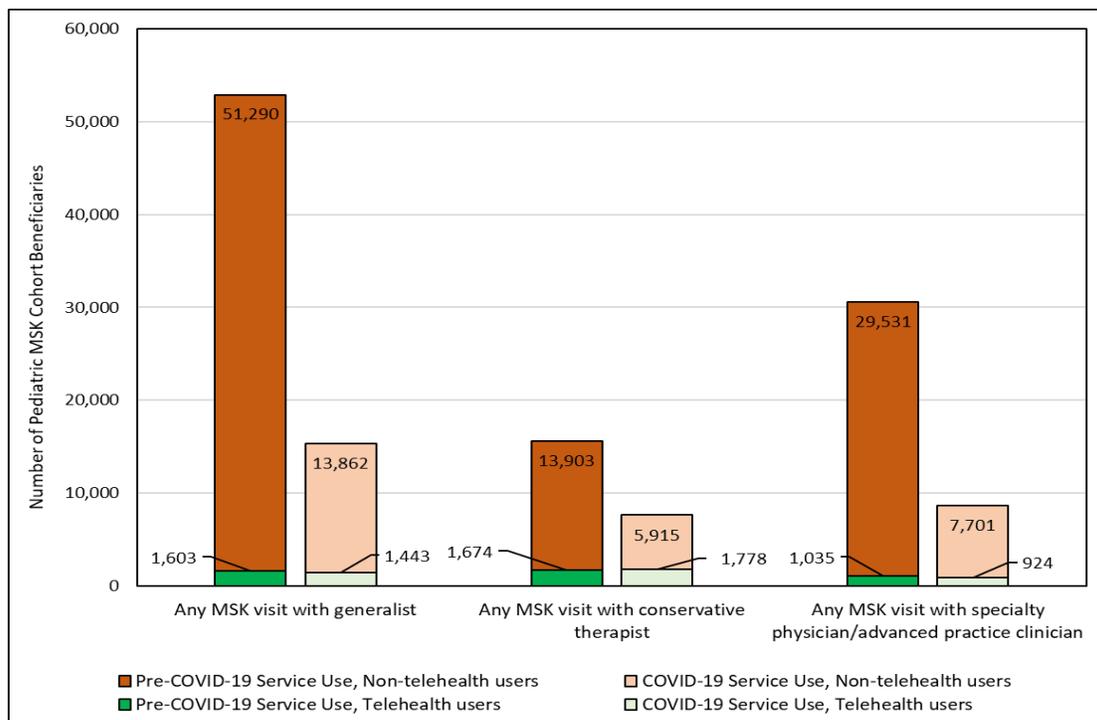
Characteristics of telemedicine users: Without adjusting for other factors, telemedicine use did not vary meaningfully across sex, race, ethnicity, and rurality. There was some variation in telemedicine use by age: 69% of those who used telemedicine in the cohort were young beneficiaries (ages 0 to 11). Conversely, 54% of those who did not use telemedicine were older beneficiaries (ages 12 to 20) (Table M1). MSK providers reported the advantages of telemedicine for individuals

with certain disabilities, but also noted that specific challenges when receiving care via telemedicine, such as those with hearing loss or those in need of interpretive language services.

Audio-only use of telemedicine appeared to increase by age. The majority of the beneficiaries <12 years did not use any audio-only telemedicine to access services. By contrast, 1 in 4 (25%) of beneficiaries ages 12-17 utilized audio-only for at least half of their MSK-related telemedicine visits, and 1 in 4 (25%) of beneficiaries ages 18-20 used audio-only for all of their MSK-related visits (data not shown). MSK providers expressed concerns regarding cessation of Medicaid coverage for physical and occupational therapy visits via telemedicine, especially given its benefits for certain populations (e.g., populations with broadband connectivity limitations).

Musculoskeletal health service use: Among these telemedicine users, utilization of various MSK-related services did not change much during the pandemic (Figure 2). In contrast, the non-telemedicine users had a dramatic reduction in MSK-specific service use during the COVID-19 pandemic (Table M2).

Figure 2. Changes in Pediatric Musculoskeletal Health Service Use from Pre- to During-COVID-19, by Telemedicine Status



Includes children < 21 as of first day of study period (March 1, 2019).

Telehealth user = At least one MSK-related telemedicine visits during COVID-19 (Apr 1 2020 – Mar 31 2021).

Non-telehealth user = Beneficiaries using in-person MSK care only during COVID-19 or those who did not access any MSK services during COVID-19.

References

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6. Research from the Community Consultation Studios reported in this publication was supported by the National Center For Advancing Translational Sciences of the National Institutes of Health under Award Number UL1TR002553. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health

Appendix A – Supplemental Tables

Table B1. Characteristics of the Behavioral Health Pediatric Cohort, Overall and by Telemedicine Use

Variable	Overall (n = 189,823)	Telemedicine user (n = 67,487)	Non-telemedicine user (n = 122,336)
Patient characteristics			
Age at beginning of study period, Median (Q1, Q3)	9.0 (5.0, 13.0)	8.0 (5.0, 12.0)	10.0 (6.0, 14.0)
Age group			
0-5 years	49,859 (26.3%)	20,809 (30.8%)	29,050 (23.7%)
6-11 years	72,343 (38.1%)	26,659 (39.5%)	45,684 (37.3%)
12-17 years	57,824 (30.5%)	17,899 (26.5%)	39,925 (32.6%)
18-20 years	9,797 (5.2%)	2,120 (3.1%)	7,677 (6.3%)
Sex			
Female	79,930 (42.1%)	28,320 (42.0%)	51,610 (42.2%)
Male	109,893 (57.9%)	39,167 (58.0%)	70,726 (57.8%)
Race			
White	111,644 (58.8%)	40,327 (59.8%)	71,317 (58.3%)
Black	62,659 (33.0%)	21,412 (31.7%)	41,247 (33.7%)
Asian	1,232 (0.6%)	457 (0.7%)	775 (0.6%)
American Indian or Alaskan Native	2,578 (1.4%)	852 (1.3%)	1,726 (1.4%)
Native Hawaiian or Pacific Islander	113 (0.1%)	38 (0.1%)	75 (0.1%)
Multiracial	10,740 (5.7%)	4,123 (6.1%)	6,617 (5.4%)
Unreported	857 (0.5%)	278 (0.4%)	579 (0.5%)
Hispanic/Latino ethnicity			
Non-Hispanic	157,097 (82.8%)	56,116 (83.2%)	100,981 (82.5%)
Hispanic	28,944 (15.2%)	9,852 (14.6%)	19,092 (15.6%)
Unreported	3,782 (2.0%)	1,519 (2.3%)	2,263 (1.8%)
Urban/rural status			
Rural	47,295 (24.9%)	16,161 (23.9%)	31,134 (25.4%)
Urban	142,528 (75.1%)	51,326 (76.1%)	91,202 (74.6%)
Charlson-Deyo Comorbidity Index, Median (Q1, Q3)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
Top diagnoses			
Neurodevelopmental and related conditions	69,819 (36.8%)	31,760 (47.1%)	38,059 (31.1%)
ADHD	67,025 (35.3%)	23,272 (34.5%)	43,753 (35.8%)
Anxiety and obsessive-compulsive disorders	31,513 (16.6%)	12,083 (17.9%)	19,430 (15.9%)
Adjustment disorder	30,020 (15.8%)	10,601 (15.7%)	19,419 (15.9%)
Disruptive behavior disorders	27,396 (14.4%)	10,931 (16.2%)	16,465 (13.5%)
Other behavioral health conditions	66,436 (35.0%)	26,518 (39.3%)	39,918 (32.6%)
Medicaid eligibility			
Blind/disabled	27,854 (14.7%)	12,757 (18.9%)	15,097 (12.3%)
Pregnant Women & BCC	92 (0.0%)	20 (0.0%)	72 (0.1%)
Income Adult	224 (0.1%)	51 (0.1%)	173 (0.1%)
General Pediatrics	149,051 (78.5%)	50,948 (75.5%)	98,103 (80.2%)
Other	12,602 (6.6%)	3,711 (5.5%)	8,891 (7.3%)
Eligible for Tailored Plan	58,891 (31.0%)	26,149 (38.7%)	32,742 (26.8%)

Includes children < 21 as of first day of study period (March 1, 2019).

Telemedicine user = At least one BH-related telemedicine visits during COVID-19 (Apr 1 2020 – March 31 2021).

Non-telemedicine user = Beneficiaries using in-person BH care only during COVID-19 or those who did not access any BH services during COVID-19.

Other behavioral health conditions include PTSD and other trauma/stress-related disorders, autism spectrum disorder, intellectual and developmental disabilities, etc.

Other in the Medicaid Eligibility include illegal and legal immigrants, refugees, NC Health Choice recipients.

Includes pediatric beneficiaries with a 1915(c) waiver or who used intensive BH services at any point during the study period.

%s are column percentages

Table B2. Services Received by the Behavioral Health Pediatric Cohort by Telemedicine Use

Variable	Overall (n = 166,719)	Telemedicine user during COVID-19 (n = 56,956)	Non- telemedicine user during COVID-19 (n = 109,763)	Neurodevelop- mental conditions (n = 65,306)	ADHD (n = 56,567)	Anxiety and OCD (n = 26,875)	Adjustment disorder (n = 26,279)	Opioid use disorder (n = 380)
<u>Pre-COVID-19 service utilization</u>								
Any BH service	166,719 (100.0%)	56,939 (100.0%)	109,780 (100.0%)	65,306 (100.0%)	56,567 (100.0%)	26,875 (100.0%)	26,279 (100.0%)	380 (100.0%)
Any psychiatric evaluation	56,070 (33.6%)	20,896 (36.7%)	35,174 (32.0%)	7,631 (11.7%)	21,841 (38.6%)	14,453 (53.8%)	16,520 (62.9%)	181 (47.6%)
Any psychotherapy	77,321 (46.4%)	27,477 (48.3%)	49,844 (45.4%)	8,116 (12.4%)	29,244 (51.7%)	19,665 (73.2%)	24,209 (92.1%)	223 (58.7%)
Any evaluation and management	28,232 (16.9%)	12,168 (21.4%)	16,064 (14.6%)	6,264 (9.6%)	14,876 (26.3%)	8,640 (32.1%)	3,674 (14.0%)	155 (40.8%)
Any neurostim- ulation	*	*	*	*	*	*	*	0 (0%)
Any psychiatric ED	18,291 (11.0%)	5,530 (9.7%)	12,761 (11.6%)	3,007 (4.6%)	8,958 (15.8%)	5,880 (21.9%)	2,032 (7.7%)	156 (41.1%)
Any collaborative care	280 (0.2%)	106 (0.2%)	174 (0.2%)	65 (0.1%)	121 (0.2%)	70 (0.3%)	68 (0.3%)	*
Any applied behavior analysis	423 (0.3%)	327 (0.6%)	96 (0.1%)	313 (0.5%)	121 (0.2%)	36 (0.1%)	*	0 (0%)
Any physical, occupational, or speech therapy	105,129 (63.1%)	39,554 (69.5%)	65,575 (59.7%)	62,966 (96.4%)	32,427 (57.3%)	10,071 (37.5%)	11,607 (44.2%)	67 (17.6%)
<u>During-COVID- 19 service utilization</u>								
Any BH service	112,941 (67.7%)	56,939 (100.0%)	56,002 (51.0%)	49,793 (76.2%)	38,971 (68.9%)	17,929 (66.7%)	17,375 (66.1%)	207 (54.5%)
Any psychiatric evaluation	22,628 (13.6%)	15,368 (27.0%)	7,260 (6.6%)	4,923 (7.5%)	9,839 (17.4%)	5,599 (20.8%)	5,089 (19.4%)	62 (16.3%)
Any psychotherapy	42,566 (25.5%)	28,239 (49.6%)	14,327 (13.1%)	6,289 (9.6%)	17,844 (31.5%)	11,442 (42.6%)	11,699 (44.5%)	115 (30.3%)
Any evaluation and management	18,063 (10.8%)	11,912 (20.9%)	6,151 (5.6%)	4,654 (7.1%)	9,671 (17.1%)	5,226 (19.4%)	2,483 (9.4%)	75 (19.7%)
Any neurostim- ulation	*	*	*	*	*	*	0 (0%)	0 (0%)
Any psychiatric ED	8,997 (5.4%)	3,685 (6.5%)	5,312 (4.8%)	1,688 (2.6%)	4,317 (7.6%)	2,777 (10.3%)	1,133 (4.3%)	75 (19.7%)
Any collaborative care	90 (0.1%)	45 (0.1%)	45 (0.0%)	21 (0.0%)	25 (0.0%)	20 (0.1%)	20 (0.1%)	*
Any physical, occupational, or speech therapy	76,626 (46.0%)	36,874 (64.8%)	39,752 (36.2%)	46,643 (71.4%)	23,215 (41.0%)	7,448 (27.7%)	9,173 (34.9%)	43 (11.3%)

*cell values <11 suppressed per Data Use Agreement; Values shown as < or > used to prevent back-calculation of the suppressed cell values.

Includes children < 21 as of first day of study period (March 1, 2019).

Telemedicine user = At least one BH-related telemedicine visits during COVID-19 (Apr 1 2020 – March 31 2021).

Non-telemedicine user = Beneficiaries using in-person BH care only during COVID-19 or those who did not access any BH services during COVID-19.

No pediatric beneficiaries received applied behavior analysis services during COVID-19, and thus it is not listed in the table.
 BH conditions assessed during the year pre-COVID-19 (Mar 1 2019 – Feb 28 2020).
 Excludes pediatric beneficiaries who had a 1915(c) waiver or who had used intensive behavioral health services during the study period.
 %s are column percentages

Table B3. Characteristics of the Behavioral Health Pediatric Cohort by BH Condition Groups

*cell values <11 suppressed per Data Use Agreement; Values shown as < or > used to prevent back-calculation of the suppressed cell values.

Variable	Neurodevelopmental and related conditions (n = 69,819)	ADHD (n = 67,025)	Anxiety and obsessive-compulsive disorders (n = 31,513)	Adjustment disorder (n = 30,020)	Opioid use disorder (n = 672)
Age at beginning of study period, Median (Q1, Q3)	5.0 (3.0, 8.0)	10.0 (7.0, 13.0)	13.0 (10.0, 16.0)	10.0 (7.0, 13.0)	18.0 (16.0, 19.0)
Age group					
0-5 years	40,223 (57.6%)	6,467 (9.6%)	1,704 (5.4%)	4,327 (14.4%)	31 (4.6%)
6-11 years	23,955 (34.3%)	35,742 (53.3%)	9,655 (30.6%)	14,092 (46.9%)	27 (4.0%)
12-17 years	5,242 (7.5%)	22,664 (33.8%)	16,421 (52.1%)	10,798 (36.0%)	215 (32.0%)
18-20 years	399 (0.6%)	2,152 (3.2%)	3,733 (11.8%)	803 (2.7%)	399 (59.4%)
Sex					
Female	23,485 (33.6%)	21,483 (32.1%)	18,725 (59.4%)	15,643 (52.1%)	391 (58.2%)
Male	46,334 (66.4%)	45,542 (67.9%)	12,788 (40.6%)	14,377 (47.9%)	281 (41.8%)
Race					
White	39,607 (56.7%)	39,361 (58.7%)	22,793 (72.3%)	19,333 (64.4%)	<500 (<73%)
Black	23,472 (33.6%)	22,707 (33.9%)	6,639 (21.1%)	8,480 (28.2%)	125 (18.6%)
Asian	711 (1.0%)	138 (0.2%)	186 (0.6%)	167 (0.6%)	*
American Indian or Alaskan Native	1,114 (1.6%)	921 (1.4%)	266 (0.8%)	260 (0.9%)	28 (4.2%)
Native Hawaiian or Pacific Islander	53 (0.1%)	25 (0.0%)	21 (0.1%)	20 (0.1%)	*
Multiracial	4,606 (6.6%)	3,671 (5.5%)	1,407 (4.5%)	1,629 (5.4%)	29 (4.3%)
Unreported	256 (0.4%)	202 (0.3%)	201 (0.6%)	131 (0.4%)	*
Ethnicity					
Non-Hispanic	54,996 (78.8%)	59,813 (89.2%)	26,557 (84.3%)	24,866 (82.8%)	582 (86.6%)
Hispanic	13,088 (18.7%)	5,831 (8.7%)	4,370 (13.9%)	4,814 (16.0%)	74 (11.0%)
Unreported	1,735 (2.5%)	1,381 (2.1%)	586 (1.9%)	340 (1.1%)	16 (2.4%)
Urban/rural status					
Rural	16,809 (24.1%)	18,292 (27.3%)	7,154 (22.7%)	6,636 (22.1%)	174 (25.9%)
Urban	53,010 (75.9%)	48,733 (72.7%)	24,359 (77.3%)	23,384 (77.9%)	498 (74.1%)
Charlson-Deyo Comorbidity Index, Median (Q1, Q3)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 1.0)
Medicaid eligibility					
Blind/disabled	15,321 (21.9%)	10,240 (15.3%)	3,355 (10.6%)	1,582 (5.3%)	84 (12.5%)
Pregnant Women & BCC	*	11 (0.0%)	42 (0.1%)	11 (0.0%)	*
Income Adult	*	37 (0.1%)	85 (0.3%)	18 (0.1%)	13 (1.9%)
General Pediatrics	<52,900 (<76%)	51,292 (76.5%)	24,542 (77.9%)	25,745 (85.8%)	<560 (<81%)
Other	1,690 (2.4%)	5,445 (8.1%)	3,489 (11.1%)	2,664 (8.9%)	26 (3.9%)
Eligible for Tailored Plan	19,903 (28.5%)	24,431 (36.5%)	12,207 (38.7%)	6,954 (23.2%)	459 (68.3%)

Includes children < 21 as of first day of study period (March 1, 2019)

Includes pediatric beneficiaries with a 1915(c) waiver or who used intensive BH services at any point during the study period
 BH conditions assessed during the year pre-COVID-19 (Mar 1 2019 – Feb 28 2020).

Other in the Medicaid Eligibility include illegal and legal immigrants, refugees, NC Health Choice recipients.

%s are column percentages

Table M1. Characteristics of the MSK Pediatric Cohort, Overall and by Telemedicine Use

Variable	Overall (n = 67,278)	Telemedicine user during COVID-19 (n = 2,630)	Non-telemedicine user during COVID-19 (n = 64,648)
Age at beginning of study period, Median (Q1, Q3)	12.0 (7.0, 15.0)	8.0 (3.0, 13.0)	12.0 (7.0, 15.0)
Age group			
0-5 years	13,220 (19.6%)	1,091 (41.5%)	12,129 (18.8%)
6-11 years	18,450 (27.4%)	714 (27.1%)	17,736 (27.4%)
12-17 years	29,872 (44.4%)	696 (26.5%)	29,176 (45.1%)
18-20 years	5,736 (8.5%)	129 (4.9%)	5,607 (8.7%)
Sex			
Female	32,577 (48.4%)	1,280 (48.7%)	31,297 (48.4%)
Male	34,701 (51.6%)	1,350 (51.3%)	33,351 (51.6%)
Race			
White	41,591 (61.8%)	<1,750 (<67%)	<39,850 (<62%)
Black	20,198 (30.0%)	634 (24.1%)	19,564 (30.3%)
Asian	639 (0.9%)	39 (1.5%)	600 (0.9%)
American Indian or Alaskan Native	1,117 (1.7%)	37 (1.4%)	1,080 (1.7%)
Native Hawaiian or Pacific Islander	47 (0.1%)	*	<45 (<1%)
Multiracial	3,151 (4.7%)	156 (5.9%)	2,995 (4.6%)
Unreported	535 (0.8%)	14 (0.5%)	521 (0.8%)
Hispanic/Latino ethnicity			
Non-Hispanic	53,516 (79.5%)	2,086 (79.3%)	51,430 (79.6%)
Hispanic	12,551 (18.7%)	456 (17.3%)	12,095 (18.7%)
Unreported	1,211 (1.8%)	88 (3.3%)	1,123 (1.7%)
Urban/rural status			
Rural	17,814 (26.5%)	550 (20.9%)	17,264 (26.7%)
Urban	49,464 (73.5%)	2,080 (79.1%)	47,384 (73.3%)
Charlson-Deyo Comorbidity Index, Median (Q1, Q3)	0.0 (0.0, 1.0)	0.0 (0.0, 1.0)	0.0 (0.0, 0.0)
Medicaid eligibility			
Blind/disabled	7,268 (10.8%)	<990 (<38%)	<6,300 (<10%)
Pregnant Women & BCC	49 (0.1%)	0 (0.0%)	49 (0.1%)
Income Adult	141 (0.2%)	*	<140 (<1%)
General Pediatrics	52,749 (78.4%)	1,464 (55.7%)	51,285 (79.3%)
Other	7,071 (10.5%)	180 (6.8%)	6,891 (10.7%)
Eligible for Tailored Plan	10,678 (15.9%)	1,010 (38.4%)	9,668 (15.0%)
Diagnosis groups			
Chronic condition	50,762 (75.5%)	2,470 (93.9%)	48,292 (74.7%)
Acute condition	26,395 (39.2%)	367 (14.0%)	26,028 (40.3%)
Other conditions	3,048 (4.5%)	220 (8.4%)	2,828 (4.4%)

*cell values <11 suppressed per Data Use Agreement; Values shown as < or > used to prevent back-calculation of the suppressed cell values. Includes children < 21 as of first day of study period (March 1, 2019).

Telemedicine user = At least one MSK-related telemedicine visits during COVID-19 (Apr 1 2020 – Mar 31 2021).

Non-telemedicine user = Beneficiaries using in-person MSK care only during COVID-19 or those who did not access any MSK services during COVID-19.

Chronic condition examples include tuberculosis of spine, arthropathies, Kaschin-Beck disease, Villonodular synovitis, rheumatism, certain arthritis include osteoarthritis, deformities, meniscus and other specific joint derangements, ankylosis, hemarthrosis.

Acute condition examples include severe fractures, joint sprains, muscle and tendon injuries, contusions.

Other condition examples include rheumatoid arthritis, gout, crystal arthropathies.

Other in the Medicaid Eligibility include illegal and legal immigrants, refugees, NC Health Choice recipients.

%s are column percentages

Table M2. Services Received by the Musculoskeletal Health (MSK) Pediatric Cohort by Telemedicine Use and Condition Group

Variable	Overall (n = 67,278)	Telemedi- cine user (n = 2,630)	Non- telemedi- cine user (n = 64,648)	Chronic MSK (n = 50,762)	Acute MSK (n = 26,395)	Other MSK (n = 3,048)
<u>Pre-COVID-19 service utilization</u>						
Any MSK service	67,278 (100.0%)	2,630 (100.0%)	64,648 (100.0%)	50,762 (100.0%)	26,395 (100.0%)	3,048 (100.0%)
Any MSK visit with generalist	52,893 (78.6%)	1,603 (61.0%)	51,290 (79.3%)	38,270 (75.4%)	23,146 (87.7%)	2,350 (77.1%)
Any MSK visit with conservative therapist	15,577 (23.2%)	1,674 (63.7%)	13,903 (21.5%)	14,973 (29.5%)	3,003 (11.4%)	925 (30.3%)
Any MSK visit with specialty physician/ advanced practice clinician	30,566 (45.4%)	1,035 (39.4%)	29,531 (45.7%)	22,754 (44.8%)	14,495 (54.9%)	1,643 (53.9%)
<u>During-COVID-19 service utilization</u>						
Any MSK service	22,844 (34.0%)	2,630 (100.0%)	20,214 (31.3%)	19,374 (38.2%)	6,862 (26.0%)	1,514 (49.7%)
Any MSK visit with generalist	15,305 (22.7%)	1,443 (54.9%)	13,862 (21.4%)	12,474 (24.6%)	5,107 (19.3%)	1,060 (34.8%)
Any MSK visit with conservative therapist	7,693 (11.4%)	1,778 (67.6%)	5,915 (9.1%)	7,163 (14.1%)	1,566 (5.9%)	461 (15.1%)
Any MSK visit with specialty physician/ advanced practice clinician	8,625 (12.8%)	924 (35.1%)	7,701 (11.9%)	7,578 (14.9%)	2,695 (10.2%)	561 (18.4%)

Includes children < 21 as of first day of study period (March 1, 2019).

MSK conditions assessed during the year pre-COVID-19 (Mar 1 2019 – Feb 28 2020)

Telemedicine user = At least one MSK-related telemedicine visits during COVID-19 (Apr 1 2020 – Mar 31 2021).

Non-telemedicine user = Beneficiaries using in-person MSK care only during COVID-19 or those who did not access any MSK services during COVID-19.

Chronic condition examples include tuberculosis of spine, arthropathies, Kaschin-Beck disease, Villonodular synovitis, rheumatism, certain arthritis include osteoarthritis, deformities, meniscus and other specific joint derangements, ankylosis, hemarthrosis.

Acute condition examples include severe fractures, joint sprains, muscle and tendon injuries, contusions.

Other condition examples include rheumatoid arthritis, gout, crystal arthropathies.

%s are column percentages

Table M3. Characteristics of the Musculoskeletal Health (MSK) Pediatric Cohort by MSK Condition Groups

Variable	Overall (n = 67,278)	Chronic MSK conditions (n = 50,762)	Acute MSK conditions (n = 26,395)	Other MSK conditions (n = 3,048)
Age at beginning of study period, Median (Q1, Q3)	12.0 (7.0, 15.0)	12.0 (8.0, 15.0)	12.0 (7.0, 15.0)	11.0 (8.0, 14.0)
Age group				
0-5 years	13,220 (19.6%)	9,247 (18.2%)	4,918 (18.6%)	508 (16.7%)
6-11 years	18,450 (27.4%)	12,704 (25.0%)	8,220 (31.1%)	1,165 (38.2%)
12-17 years	29,872 (44.4%)	23,993 (47.3%)	11,362 (43.0%)	1,163 (38.2%)
18-20 years	5,736 (8.5%)	4,818 (9.5%)	1,895 (7.2%)	212 (7.0%)
Sex				
Female	32,577 (48.4%)	25,822 (50.9%)	11,041 (41.8%)	1,482 (48.6%)
Male	34,701 (51.6%)	24,940 (49.1%)	15,354 (58.2%)	1,566 (51.4%)
Race				
White	41,591 (61.8%)	31,748 (62.5%)	16,052 (60.8%)	<1,870 (<62%)
Black	20,198 (30.0%)	14,957 (29.5%)	8,168 (30.9%)	941 (30.9%)
Asian	639 (0.9%)	475 (0.9%)	232 (0.9%)	32 (1.0%)
American Indian or Alaskan Native	1,117 (1.7%)	815 (1.6%)	486 (1.8%)	48 (1.6%)
Native Hawaiian or Pacific Islander	47 (0.1%)	36 (0.1%)	19 (0.1%)	*
Multiracial	3,151 (4.7%)	2,279 (4.5%)	1,281 (4.9%)	130 (4.3%)
Unreported	535 (0.8%)	452 (0.9%)	157 (0.6%)	30 (1.0%)
Hispanic/Latino ethnicity				
Non-Hispanic	53,516 (79.5%)	40,225 (79.2%)	21,491 (81.4%)	2,256 (74.0%)
Hispanic	12,551 (18.7%)	9,547 (18.8%)	4,534 (17.2%)	721 (23.7%)
Unreported	1,211 (1.8%)	990 (2.0%)	370 (1.4%)	71 (2.3%)
Urban/rural status				
Rural	17,814 (26.5%)	13,296 (26.2%)	7,443 (28.2%)	725 (23.8%)
Urban	49,464 (73.5%)	37,466 (73.8%)	18,952 (71.8%)	2,323 (76.2%)
Charlson-Deyo Comorbidity Index, Median (Q1, Q3)	0.0 (0.0, 1.0)	0.0 (0.0, 1.0)	0.0 (0.0, 0.0)	0.0 (0.0, 1.0)
Medicaid eligibility				
Blind/disabled	7,268 (10.8%)	6,447 (12.7%)	1,423 (5.4%)	455 (14.9%)
Pregnant Women & BCC	49 (0.1%)	43 (0.1%)	11 (0.0%)	0 (0%)
Income Adult	141 (0.2%)	111 (0.2%)	57 (0.2%)	*
General Pediatrics	52,749 (78.4%)	38,787 (76.4%)	22,040 (83.5%)	2,235 (73.3%)
Other	7,071 (10.5%)	5,374 (10.6%)	2,864 (10.9%)	355 (11.6%)
Eligible for Tailored Plan	10,678 (15.9%)	8,903 (17.5%)	3,165 (12.0%)	538 (17.7%)

*cell values <11 suppressed per Data Use Agreement; Values shown as < or > used to prevent back-calculation of the suppressed cell values.

Includes children < 21 as of first day of study period (March 1, 2019).

MSK conditions assessed during the year pre-COVID-19 (Mar 1 2019 – Feb 28 2020)

Chronic condition examples include tuberculosis of spine, arthropathies, Kaschin-Beck disease, Villonodular synovitis, rheumatism, certain arthritis include osteoarthritis, deformities, meniscus and other specific joint derangements, ankylosis, hemarthrosis.

Acute condition examples include severe fractures, joint sprains, muscle and tendon injuries, contusions.

Other condition examples include rheumatoid arthritis, gout, crystal arthropathies.

Other in the Medicaid Eligibility include illegal and legal immigrants, refugees, NC Health Choice recipients.

%s are column percentages