


Changes in Primary Care Visits in the 24 Weeks After COVID-19 Stay-at-Home Orders Relative to the Comparable Time Period in 2019 in Metropolitan Chicago and Northern Illinois

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Abstract

Objective: In this brief report, we characterize pediatric primary care service utilization in metropolitan Chicago over the first 24 weeks of the COVID-19 pandemic response in relation to the comparable time period in 2019. **Methods:** We examined retrospective visit and billing data, regardless of payer, from 16 independent pediatric practices that utilize a common electronic medical record platform within an Accountable Care Organization of 252 pediatricians in 71 offices throughout metropolitan Chicago. We categorized visits as Well-Child and Immunization-Only (WC-IO) or Other types and identified visits with a telemedicine billing modifier. Diagnoses for Other visits were tallied and categorized using the Agency for Healthcare Research and Quality Clinical Classification System. We summarized counts of visits and the proportion of visits with a telemedicine billing modifier in one-week epochs for 2020 compared with 2019. **Results:** There were 102 942 total visits (72 030 WC-IO; 30 912 Other) in 2020 and 144 672 visits (80 578 WC-IO; 64 094 Other) in 2019. WC-IO visits in 2020 were half of 2019 visits at the start of the Illinois Stay-at-Home Order and returned greater than 90% of 2019 visits in 8 weeks. Other visit types have remained below 70% of 2019 visits. A telemedicine billing modifier peaked in mid-April (21% of all visits) and declined to <10% of all visits in June (Phase 2 reopening). The top 10 most common diagnoses differed between years. **Conclusions:** Recovery of well child and immunization visits suggests that practice-level efforts and policy change can ensure children receive recommended care as the pandemic evolves.

Keywords

pediatric, primary care, utilization, COVID-19

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Introduction

Children are potentially more vulnerable to the effects of public health responses to mitigate spread of SARS-CoV-2¹⁻⁴ than they are to infection from the virus itself.^{5,6} Public health measures, including masking, physical distancing, and limits on gatherings, are expected to continue to some extent until scientists find an effective treatment or vaccine. Stay-at-home orders, enacted in Illinois on March 21, 2020, have caused children to experience loss of in-person education, group activities, and social connections. Families have experienced loss of jobs, housing, and food resources. In addition to the social, emotional, and nutritional impacts on children, there have been reports of dramatic declines in vaccine administration^{7,8} and emergency department utilization.^{6,9}

Primary care is the mainstay of healthcare for children in the US but patterns of primary care utilization by children after the implementation of stay-at-home orders have not been described. The US healthcare system changed rapidly in response to awareness of community spread of COVID-19 infection in early March 2020. Federal and state policy makers loosened restrictions at the federal and state level on

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telehealth, payers increased telehealth reimbursement, and healthcare providers rapidly expanded telehealth services to patients and families.¹⁰⁻¹² In late April 2020,¹³ the lay press reported on reductions in childhood vaccine administration. This was followed by social media campaigns to encourage families to return to care and to call their pediatrician.^{1,14} In this brief report, we characterize primary care service utilization in metropolitan Chicago over the first 24 weeks of the COVID-19 pandemic response in relation to the comparable time period in the year prior.

Methods

We examined retrospective visit and billing data from 15 pediatric practices within the Lurie Children's Pediatric Partners (LCPP), an Accountable Care Organization (ACO) of 252 pediatricians in 71 pediatric primary care offices throughout metropolitan Chicago including northern Illinois and northwest Indiana. The 15 practices included in this study were selected because they share a common electronic medical record platform (Epic EMR, Verona, WI) that supplies visit data nightly to LCPP. Five practices were within the city of Chicago, 7 were in suburban Cook County, and 3 were in Winnebago County. Practices were primarily small and medium size with 4 solo practitioners, 6 practices with 3-5 providers, and 4 practices with 7-9 providers. There were 2 larger practice groups with 20 and 27 total providers and 2 offices each. The LCPP practices function independently but are connected through the value-based contracts and quality improvement initiatives of the ACO. This analysis of deidentified visit counts is considered Non-Human Subjects Research by the Lurie Children's Institutional Review Board.

We examined the included practices' total visits made by children, regardless of payer, in one-week epochs, over the 24 weeks from March 22 through September 5, 2020 and the comparable period in 2019. In addition, we provide baseline data from the 4 weeks prior to the COVID-19 pandemic response and the comparable period in 2019. Data were extracted on September 25, 2020 to account for delays in closure of visits in the electronic medical record (EMR).

The 2020 timeframe of this study represents 4 phases of the Illinois response to COVID-19: (1) on March 23, 2020, the governor issued a Stay-at-Home Executive Order, which limited healthcare visits to emergencies and COVID-19 care, closed schools to in-person instruction, and limited daycare to groups of 10 or fewer children of essential workers; (2) on May 11, 2020 Phase 2 began, which allowed for elective procedures and essential gatherings of 10 or fewer people; (3) in the first week of June 2020, Illinois entered Phase 3 of reopening, which lifted restrictions on healthcare services, limited opening of daycare and summer camp programs, permitted gatherings of 10 or fewer people for any reason and allowed outdoor seating at restaurants; (4) on

June 26, 2020 Phase 4 began, which expanded daycare and summer camp programs and allowed for opening of more businesses with capacity limits. Illinois continued in Phase 4 through September 5, 2020. In August, schools outside of the city of Chicago opened to various hybrid, in-person, and remote learning models. Most schools in the city of Chicago, including Chicago Public Schools, opened to remote learning on September 8, 2020, after Labor Day and after our study period.

We identified well-child and immunization-only (WC-IO) visits based on the presence of Current Procedural Terminology (CPT) Evaluation and Management codes for a well-child visit, a billing line item belonging to the Immunization/Injection grouping, or an International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) code for Health Examination or Participation in Sport. All other visits were categorized as Other. We used CPT codes to identify visits with a telemedicine modifier. To characterize the types of Other visits, we applied Agency for Healthcare Research and Quality (AHRQ) Clinical Classification Software (CSS) version 2020.1 to the principal ICD-10-CM codes associated with these visits.

We present counts and percentages for WC-IO and Other visit types for each week for the 2 years included in the study. In addition, we present counts and percentages of visits with a telemedicine billing modifier by age groups (younger than 2 years, 2-5 years, 6-10 years, 11-13 years, and 14 years or older) for both years. We did not perform statistical hypothesis testing for the descriptive study results in this brief report.

Results

There were 102 942 total visits (72 030 WC-IO and 30 912 Other) during the 24 weeks in 2020 compared with 144 672 visits (80 578 WC-IO and 64 094 Other) in the comparable timeframe in 2019. Immunization-only visits represented 9% of WC-IO visits in both 2020 and 2019. The payer mix for the included practices was consistent over the 2 years of study, 93% private, 6% public, and 1% other.

Figure 1 shows the pattern of primary care utilization over the 4 weeks before and the 4 weeks of the initial COVID-19 Stay-at-Home Order as well as in Phase 2, 3, and 4 of Reopening. All visits showed a dramatic decline in the two weeks prior to the Stay-at-Home Order (between March 8 and March 22, 2020). WC-IO visits steadily increased starting in week 3 of the Illinois Stay-at-Home Order and by the end of Phase 2 were at 90% of the 2019 baseline. In Phase 3 and 4, WC-IO visits returned to 2019 levels, with decreases around Memorial Day and Fourth of July in both years and Labor Day in 2019. In contrast, Other visit types have remained low since March 22, 2020 without an increase since resumption of elective healthcare

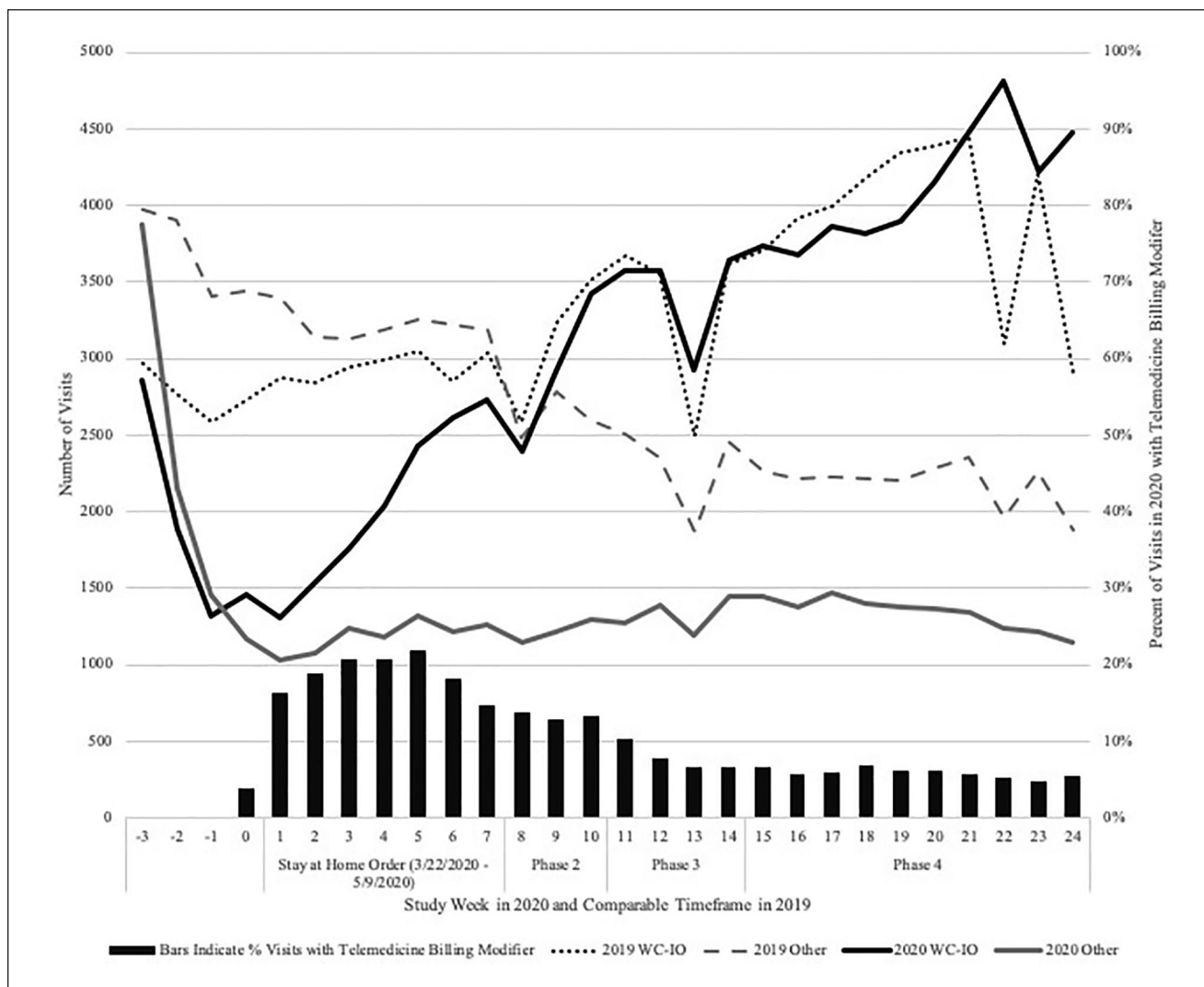


Figure 1. Trends in Primary Care Utilization.

services and the phased reopening of daycare, school, and camp programs. A telemedicine billing modifier was not observed in the included practices before the week of March 15. In the week of March 15 a telemedicine billing modifier was present for 4% of visits. There was a rapid increase in application of a telemedicine billing modifier peaking at 22% in the week of April 29. From the start to end of May, a telemedicine billing modifier was applied to 18% to 13% of visits, respectively. A telemedicine billing modifier was applied to 5-8% of visits since June.

Table 1 shows the number of visits for each age group by visit type in the study timeframe for 2020 and 2019. During both years, the youngest children (<2 years) had the greatest number of visits, primarily WC-IO. This age group represented 42% of all visits in 2020 and 39% of all visits in 2019. The smallest number of visits were for 11- to 13-year-olds, representing 9% of all visits in both years. There were

no telemedicine billing modifiers on visits in the 2019 timeframe for any included practice. The percentage of visits with a telemedicine modifier varied slightly across age groups (Table 1).

The top 10 primary ICD-10-CM codes associated with Other visits in 2020 included fewer visits for upper respiratory, ear and throat infections and relatively more visits for fever, skin disorders, and mental health conditions (Table 2). The top 10 primary ICD-10-CM code diagnoses represented 22.2% of Other visits in 2020 and 33.5% of Other visits in 2019. Rash and dermatitis ranked second and seventh overall in 2020, 2nd and 4th for visits with a telemedicine billing modifier but were not ranked in the top 10 in 2019. Attention-deficit hyperactivity disorder was ranked fourth for Other visits overall; third and ninth for visits with a telemedicine billing modifier in 2020; generalized anxiety disorder was eighth among visits with a telemedicine billing modifier but

Table 1. Total Visits and Telehealth Visits by Age Group, 2019 and 2020.

Age group	24 weeks, mid-March through August							
	2019				2020			
	WC-IO visits	Other visits	WC-IO visits	% of 2019 WC-IO visits	Other visits	% of 2019 other visits	Visits with telemedicine modifier*	% 2020 visits with telemedicine modifier
<2 years old	35 150	21 792	32 593	92.7%	10 286	47.2%	3246	7.6%
2-5 years old	13 058	17 872	11 476	87.9%	6820	38.2%	2309	12.6%
6-10 years old	12 523	12 402	10 415	83.2%	6253	50.4%	1986	11.9%
11-13 years old	8348	4969	7039	84.3%	2753	55.4%	850	8.7%
14+ years old	11 499	7059	10 507	91.4%	4800	68.0%	1291	8.4%
All ages	80 578	64 094	72 030	89.4%	30 912	48.2%	9682	9.4%

Abbreviations: WC-IO, Well-child and immunization only visits.

*There were no visits in the study practices with a telemedicine modifier in 2019.

Bold text indicates the total for all age groups.

were not ranked in the top 10 in 2019. When the primary ICD-10-CM codes were aggregated using the CCS, there was more overlap between categories in 2019 and 2020, but the rankings differed (Table 3). For example, fever ranked first in 2020 overall and for visits with a telemedicine billing modifier whereas fever ranked third in 2019. The CCS categories represented a smaller proportion of Other visits in 2020 (41.7%) than in 2019 (54.2%).

Discussion

This analysis of healthcare utilization from 16 primary care practices in metropolitan Chicago and northern Illinois, documents the dramatic decreases in primary care visits during the early weeks of the Stay-at-Home Executive Order in Illinois relative to the prior year. We observed a slow but steady return to 2019 levels of WC-IO visits over the study period as Chicago and Illinois faced high rates of COVID-19 infections into June.¹⁵ The return of these visits occurred in the setting of active efforts to encourage families to catch up on delayed immunizations. Each practice was given the freedom to determine the best approach for their individual circumstances, drawing on resources from LCPP webinars and email communications. Some practices utilized their EMR and the LCPP population health management platform to send text and email messages that promoted return to care. It is also possible that families sought well child care after exposure to press coverage of declines in immunization rates and mass media campaigns emphasizing safety measures health systems put in place to prevent spread of infection. Although, each state and region has been impacted by COVID-19 infections on different time courses and public health responses have varied, our results demonstrate that WC-IO visits can return to pre-pandemic levels. These findings can be utilized by policy makers to ensure that essential pediatric well child and

immunization visits are maintained if restrictions on health-care visits are reinstated.

In contrast to WC-IO visits, the number of Other visits has been persistently suppressed, despite resumption of elective healthcare services and reopening of daycare, school, and camp programs in the area. The top 10 ICD-10-CM code diagnoses and CCS categories represented smaller proportions of Other visits in 2020 than 2019. This indicates a lower concentration of visits for the most common conditions in 2020. The practices included in our analysis saw fewer children for respiratory, ear, and throat infections since the start of the pandemic than the comparable time period in the prior year. The predominance of fever and skin disorders in the top 10 lists from 2020 could reflect evaluation for symptoms of COVID-19 compatible illness and concerns for skin changes associated with post-viral inflammatory syndrome¹⁶⁻¹⁸ that received much media attention in May and June 2020. The presence of mental health concerns including attention deficit hyperactivity disorder and anxiety in the top 10 lists for Other visits with a telehealth modifier may be indicative of the emotional stress of the pandemic and suggests these conditions are amenable to telemedicine.

Our results also demonstrate the role that telemedicine played during the pandemic in a sample of pediatric primary care practices with largely privately-ensured patient populations. These findings mirror reports of the rapid expansion of telemedicine services at the start of the pandemic response.^{1,10} The telemedicine modifier was not observed within included practices until 1 week prior to the issuance of the Illinois Stay-at-Home Executive Order. Prior to the pandemic, parity laws had been passed in 29 states and the District of Columbia, but not in Illinois. Within 2 weeks after the Stay-at-Home Order, up to 20% of pediatric primary care visits in study practices had a telemedicine modifier. As Illinois reopened, telehealth visits

Table 2. Top 10 Principal ICD-10-CM Code Diagnoses for Other Visit Types in the 24 Weeks Study Period.

2019 other visits		2020 other visits		2020 other visits with telehealth modifier	
ICD-10-CM diagnosis description	N	ICD-10-CM diagnosis description	N	ICD-10-CM diagnosis description	N
1. Acute upper respiratory infection, unspecified	4744	1. Fever, unspecified	1843	1. Fever, unspecified	685
2. Acute pharyngitis, unspecified	3306	2. Rash and other nonspecific skin eruption	919	2. Rash and other nonspecific skin eruption	535
3. Fever, unspecified	3278	3. Acute pharyngitis, unspecified	821	3. Attention-deficit hyperactivity disorder, combined type	331
4. Streptococcal pharyngitis	1900	4. Attention-deficit hyperactivity disorder, combined type	593	4. Dermatitis, unspecified	261
5. Viral infection, unspecified	1567	5. Acute upper respiratory infection, unspecified	529	6. Cough	194
6. Cough	1518	6. Dysuria	451	6. Acute upper respiratory infection, unspecified	185
7. Acute suppurative otitis media without spontaneous rupture of ear drum, right ear	1487	7. Dermatitis, unspecified	445	7. Diaper dermatitis	174
8. Acute suppurative otitis media without spontaneous rupture of ear drum, bilateral	1355	8. Encounter for follow-up examination after completed treatment for conditions other than malignant neoplasm	436	8. Generalized anxiety disorder	172
9. Acute suppurative otitis media without spontaneous rupture of ear drum, left ear	1323	9. Encounter for other preprocedural examination	423	9. Contact with and (suspected) exposure to other viral communicable diseases	151
10. Encounter for follow-up examination after completed treatment for conditions other than malignant neoplasm	981	10. Cough	415	10. Attention-deficit hyperactivity disorder, predominantly inattentive type	143

dropped to less than 10% of total visits to practices included in this study. In Phase 4, visits with a telehealth modifier stabilized around 5% (approximately 300 visits per week across the 16 practices) and have been maintained at this level throughout Summer 2020. Policy makers in states without telemedicine parity have an opportunity to pass legislation that expands access to this model of care.

While the lack of Other visits may signal that children are gaining the benefit of fewer infections from staying home, these findings raise concerns for the financial viability of pediatric practices. Telemedicine reimbursement provided a financial lifeline for practices at the start of the pandemic. With dramatic suppression of healthcare utilization for children, now may be an opportune time for pediatric care to shift toward value-based contracts. If reimbursement is maintained, telehealth visits could play a bigger role in the provision of pediatric care in the future. Providers, practices, and patients now have greater experience and comfort with the delivery of remote care. Providers and payers have an opportunity to reshape patterns of healthcare seeking for children as we establish a new normal in the United States. These are important areas for program evaluation, quality improvement, and research

Our study is subject to limitations. First, our results are drawn from 16 practices in metropolitan Chicago and northern Illinois, on a common EMR, caring primarily for privately insured patients and may not be generalizable to other settings. There is practice variation in the number of providers and the urban and suburban locations. Second, we are unable to determine the cause for the return of well child and immunization only visits because each practice had the ability to tailor their approach to encouraging families to return to care. Third, we can only hypothesize as to reasons why Other visit types have remained lower in 2020 than 2019 throughout the 24 week study. We cannot determine if children are experiencing fewer infections or their families are less likely to seek care for infectious symptoms due to concerns about contracting COVID-19 in clinical settings. Similarly, we do not have data on the individual patient or practice-level factors that contributed to the resumption of WC-IO visits. Nevertheless, these results present timely baseline estimates of the impact of COVID-19 on child healthcare utilization in a major metropolitan area. Finally, our findings are subject to the accuracy of electronic medical record data.

Table 3. Top 10 Clinical Classification System Groupings based on Primary Diagnosis for Other Visit Types in 2019 and 2020.

Clinical classification system grouping 2019	N	Clinical classification system grouping 2020	N	Clinical classification system grouping 2020 telehealth	N
1. Other specified upper respiratory infections	11 202	1. Fever	1862	1. Fever	690
2. Otitis media	7394	2. Other specified upper respiratory infections	1787	2. Neurodevelopmental disorders	671
3. Fever	3310	3. Other general signs and symptoms	1521	3. Skin/Subcutaneous signs and symptoms	600
4. Viral infection	2926	4. Other specified and unspecified disorders of the ear	1485	4. Other specified and unspecified skin disorders	514
5. Respiratory signs and symptoms	2413	5. Neurodevelopmental disorders	1306	5. Other specified inflammatory condition of skin	410
6. Other general signs and symptoms	1729	6. Skin/Subcutaneous signs and symptoms	1103	6. Other general signs and symptoms	372
7. Cornea and external disease	1510	7. Viral infection	1050	7. Respiratory signs and symptoms	346
8. Abdominal pain and other digestive/abdomen signs and symptoms	1469	8. Other specified and unspecified skin disorders	978	8. Other specified upper respiratory infections	342
9. Other specified and unspecified disorders of the ear	1397	9. Otitis media	925	9. Anxiety and fear-related disorders	334
10. Neurodevelopmental disorders	1375	10. Respiratory signs and symptoms	878	10. Skin and subcutaneous tissue infections	319

Conclusion

The COVID-19 pandemic and public health response to control the spread of infections has shaped patterns of primary care utilization for children in metropolitan Chicago and northern Illinois. Our findings can inform future research on pediatric primary care delivery models as areas affected by COVID-19 reopen, schools experiment with different learning models to mitigate the spread of the virus, and we approach the winter viral season. Our findings can also shape policy for telemedicine and essential healthcare services to ensure that children receive recommended and medically necessary care as the COVID-19 pandemic unfolds.

Declaration of Conflicting Interests

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