

Changes in Sick Visits at an Academic Pediatric Primary Care Practice due to the COVID-19 Pandemic

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ABSTRACT

BACKGROUND/OBJECTIVE: The COVID-19 pandemic decreased pediatric patient volumes; however, details regarding patterns of use within primary care sick visits are not well understood.

METHODS: We performed a retrospective chart review of sick visits in an academic primary care clinic from March–August 2019 and 2020 and recorded demographics and visit diagnoses. Descriptive statistics, Chi-square, and Fisher's exact tests were used to compare the two time periods.

RESULTS: Patient age, gender, and insurance type were similar across years. In 2020, there were 1,868 sick visits (247 telehealth, 4%–36% of monthly visits) compared to 4,007 (0 telehealth) in 2019. The proportion of infectious diagnoses decreased (35% vs 48%); non-infectious diagnoses increased, including dermatological (25% vs 19%) and genitourinary/reproductive (9% vs. 6%) diagnoses.

CONCLUSION: Similar to pediatric emergency departments, we found decreased primary care sick visits. Telehealth increased in 2020 and varied with COVID-19 community prevalence. Visits for contagious illnesses decreased in 2020, likely related to mitigation measures.

KEYWORDS: COVID-19, pediatric, outpatient, sick visits, primary care

INTRODUCTION

The COVID-19 pandemic decreased pediatric patient volumes for both sick and well children. Studies have shown 10% of pediatric practices were closed, with 19% of practices not offering routine immunizations.¹ In addition to well visits, pediatric sick visit volumes were significantly affected by the pandemic. In the first months of the pandemic, pediatric emergency room visits decreased by 68% and hospitalizations decreased by 45%.² Other studies have shown this trend to continue through August 2020, with emergency room visit volumes decreased by 46% compared to the year prior.³

Stay-at-home orders and social distancing played a major role in these declines by way of reducing illness exposure, with some studies finding a reduction of over 60%

in contagious illnesses such as bronchiolitis and gastroenteritis.² At the same time, the incidence of urinary tract infections, a non-communicable disease, has been shown to remain relatively stable.² The pandemic also resulted in other changes in patterns of illness in pediatrics, including delays in care,^{4,5} increases in physical child abuse,⁶ and decreases in daycare, school, and organized sports-related injuries as well as trauma operations.⁷

Little is known about how the pandemic has impacted sick visits in pediatric primary care offices. This setting differs from emergency settings in access to resources such as personal protective equipment and space limitations, particularly when trying to continue to provide preventive well care for healthy children. In addition, outpatient pediatric practices have less familiarity with infection control practices, which are standard in emergency rooms and hospitals, requiring many offices to make adaptations in their standard operating procedures to continue to care for children amidst a pandemic. Practices have made adjustments not required of emergency rooms such as scaling back visits, expanding telemedicine, cohorting sick and well patients by time and space, and separating staff into sick and well teams.⁸

To address some of the challenges of in-person visits during a pandemic, some pediatric offices expanded the use of telemedicine. In 2019, only 8% of Americans had used telemedicine. By March 2020, amidst stay-at-home orders, the United States issued waivers for telemedicine regulations, and insurance providers expanded their coverage to include telemedicine visits.⁹ Many practices rapidly integrated telemedicine, with one study finding 44% of Medicare primary care visits were provided through telemedicine compared with less than one percent before the pandemic.⁹

We examined in-person and telemedicine sick visits over a six-month period early in the pandemic in a pediatric primary care office to investigate changes in sick visit patterns compared to the year prior.

METHODS

We conducted a retrospective chart review of all sick visits within a large urban academic pediatric primary care clinic at Hasbro Children's Hospital in Rhode Island between March–August 2019 (before the COVID-19 pandemic) and March–August 2020 (early in the COVID-19 pandemic). The

clinic serves children from multi-ethnic backgrounds and families with low income and offers same-day sick visits. Pediatric faculty and residents staff the clinic. The hospital Institutional Review Board approved this study.

We included in-person and telemedicine sick visits for patients up to age 18. We excluded well child and follow-up visits. Charts were reviewed for patient demographics (age, gender, chart-documented race and ethnicity, and preferred language), method-of-visit delivery (in-person or telemedicine), and visit diagnoses. Encounter date was used to generate tallies of total sick visits each day for both time periods.

We reviewed International Classification of Diseases – 10 billing diagnosis codes to determine visit diagnoses. We further categorized diagnoses into one of 16 categories: acute otitis media (AOM), allergy, asthma, cardiology, non-infectious gastroenterology, genitourinary (GU)/reproductive, infectious, injury, musculoskeletal, neurological, newborn concerns, non-infectious head/ear/eye/nose/throat (HEENT), psychological/behavior, dermatologic, surgical, and “other” if diagnosis did not fall into one of the previous groups. Any question that came up regarding the categorization of a diagnosis was marked and categorized by group consensus. If a visit had two separate diagnoses (for example, acute otitis media and urinary tract infection), we included both diagnoses categories in our analysis.

Statistical Analysis

We performed descriptive analysis and compared patient demographics and sick visits by month between 2019 and 2020 using Chi-square tests. We superimposed key pandemic milestones onto a histogram of visits over time for 2020. We ranked diagnosis categories in 2019 by highest incidence and compared this to the overall incidence of each diagnosis in 2020, using Chi-square and Fisher’s exact tests to compare the proportion of diagnoses in 2019 to 2020. We also reported six selected diagnosis categories (AOM, asthma, infectious, GU/reproductive, psychological, and dermatologic) and show monthly visit data for these categories in 2019 and 2020 in histogram format. The diagnosis categories were chosen to represent those with some seasonal variation and some non-seasonal diagnoses and align with related literature.^{2,10,11} We also reported diagnosis categories for telemedicine visits in 2020.

RESULTS

From March 1st to August 31st, 2019, there were 4,007 sick visits, with zero telemedicine visits. In the same time period in 2020, there were fewer visits, with 1,868 sick visits. Median patient age, gender, and percentage of patients with Medicaid were similar between 2019 and 2020. There was significant variation in distribution of monthly sick visits in 2019 compared to 2020 ($p < 0.001$, see **Table 1**). **Figure 1** shows visits over time in the study period.

Table 1. Patient demographics and monthly sick visits from March through August 2019 and 2020

	2019 N=4007	2020 N=1868	p-value
Age in years, median (IQR)	5 (1-11)	6 (2-11)	0.080
Female gender, n(%)	2003 (50)	966 (52)	0.229
Medicaid, n(%)	3513 (88)	1654 (89)	0.054
Monthly sick visits, n(%)			<0.001
March	748 (19)	456 (24)	
April	842 (21)	206 (11)	
May	806 (20)	234 (13)	
June	515 (13)	286 (15)	
July	554 (14)	363 (19)	
August	542 (14)	323 (17)	

Table 2. Overall incidence of diagnosis categories from March to August in 2019 and 2020^a

2019			2020			
Rank	Diagnosis	Number of visits (%)	Rank	Diagnosis	Number of visits (%)	p-value ^b
1	Infectious	1912 (48)	1	Infectious	645 (35)	<0.001
2	Dermatologic	777 (19)	2	Dermatologic	468 (25)	<0.001
3	Allergic	297 (7)	8	Allergic	110 (6)	0.037
4	Non-infectious HEENT	299 (7)	4	Non-infectious HEENT	166 (9)	0.067
5	Gastroenterology	273 (7)	5	Gastroenterology	144 (8)	0.234
6	GU/Reproductive	250 (6)	3	GU/Reproductive	176 (9)	<0.001
7	Other	248 (6)	7	Other	128 (7)	0.363
8	Asthma	235 (6)	11	Asthma	64 (3)	<0.001
9	Injury	233 (6)	6	Injury	128 (7)	0.138
10	Acute Otitis Media	218 (5)	14	Acute Otitis Media	45 (2)	<0.001
11	Musculoskeletal	162 (4)	10	Musculoskeletal	78 (4)	0.86
12	Newborn Concerns	136 (3)	9	Newborn Concerns	100 (5)	<0.001
13	Neurological	125 (3)	13	Neurological	51 (3)	0.464
14	Psychological	105 (3)	12	Psychological	61 (3)	0.192
15	Cardiology	55 (1)	15	Cardiology	37 (2)	0.102
16	Surgical	5 (0)	16	Surgical	6 (0)	0.115 ^c

^a Encounters may have had multiple diagnoses, thus percentages add up to >100%

^b Chi-square test unless otherwise indicated. Bolded values indicate $p < 0.05$

^c Fisher’s exact test

Figure 1. Daily visit totals from March through August 2019 (top panel) and daily visit totals from March through August 2020 (bottom panel), with stacked bars for in-person vs. telemedicine visits and superimposed key pandemic events in Rhode Island in 2020

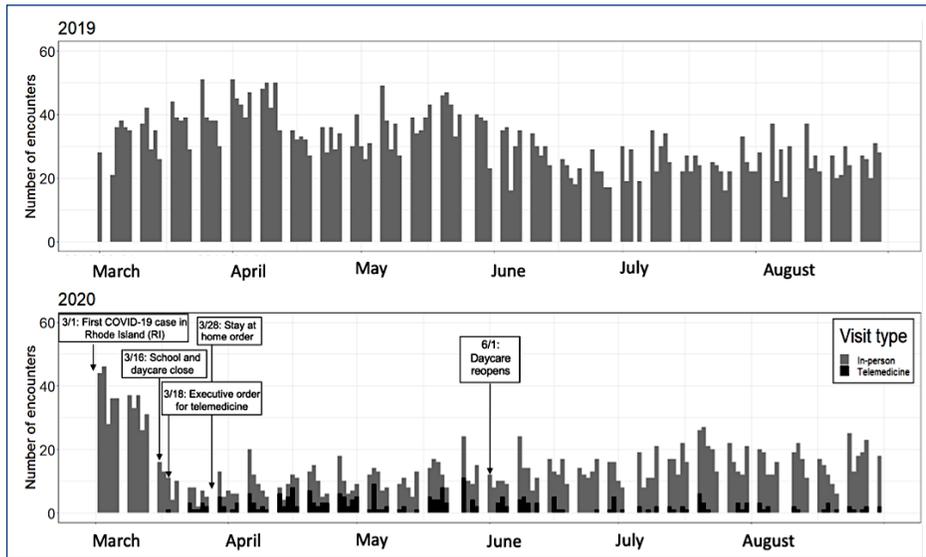
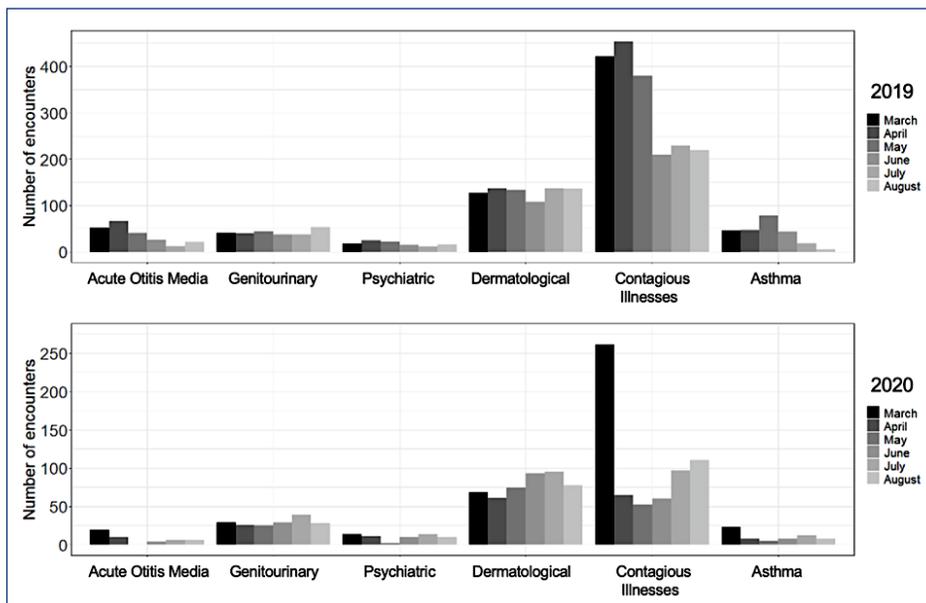


Figure 2. Monthly number of visits for selected diagnosis categories over time from March to August in 2019 and 2020



Telemedicine Visits

Telemedicine visits started in March 2020, immediately after Rhode Island law expanded access to telemedicine.¹² Telemedicine visits continued through the 2020 study period with a total of 247 visits over six months (13% of all sick visits). April and May had the highest number of telemedicine sick visits with 71 and 63 visits respectively (35% and 27% of monthly visits). March had the lowest number of telemedicine visits with 18 visits (4% of visits).

Diagnosis Frequency

There were fewer visits for every diagnosis category in 2020 compared to 2019 (see **Table 2**). The proportion of visits in the general infectious diseases category and AOM category were significantly decreased in 2020 compared to 2019 (35% vs. 48% and 2% vs. 5%, respectively, $p < 0.001$ for both). Newborn concerns also decreased in 2020 compared to 2019 ($p < 0.001$, 5% vs 9%). In contrast, the proportion of visits for the majority of non-infectious diagnosis categories were increased in 2020 compared to 2019, such as dermatological disorders ($p < 0.001$, 25% vs. 19%), GU/reproductive ($p < 0.001$, 9% vs. 6%), and allergic ($p = 0.037$, 7% vs. 6%). Of the 247 telemedicine visits in 2020, the most common diagnoses were dermatological disorders ($n = 90$, 36%), general infectious diseases ($n = 79$, 32%), and allergic conditions ($n = 30$, 12%).

Monthly Changes in Select Diagnosis Over Time

Contagious illnesses, including AOM and viral illnesses, were seen more at the beginning of the pandemic and decreased throughout. Genitourinary, dermatologic, and psychiatric chief complaints were relatively stable throughout the pandemic (**Figure 2**).

DISCUSSION

Changes in sick visit volume and type were seen during the COVID-19 pandemic. Not surprisingly, there were fewer in-person sick visits in the early part of the pandemic,

similar to data found in both pediatric and adult emergency medicine studies.^{3,13}

Every diagnosis category in 2020 had fewer visits than 2019. While we expected a decrease in visits for contagious chief complaints, the reduction in visits for several non-infectious categories raises the question of missed diagnoses or delays in care. For example, there were about one-third fewer visits for newborn concerns, which is surprising as the birth rate remained relatively stable.¹⁴ Parents of newborns

were likely weighing the risk of exposure to COVID-19 with the significance of their newborn concerns and opted to stay home. While this may have resulted in fewer visits for the “worried well” and more prudent care utilization, it may have also resulted in increased stress for parents and increased the risk of newborn complications such as dehydration, hyperbilirubinemia, and need for exchange transfusions. With fewer newborn visits, there were also fewer opportunities for breastfeeding support, close monitoring of weight gain, and screening for post-partum depression. Not surprisingly, Edinburg Postnatal Depression Scales were found to be higher during the pandemic,¹⁵ indicating an increased urgency for pediatric providers to screen for maternal depression despite decreased newborn volume. Other studies have also shown an increase in complications outside of the newborn period due to delays in care in the setting of the pandemic, such as an increase in rates of complicated appendicitis.^{4,5}

The top sick visit diagnostic categories in our study were infectious and dermatologic in 2019 and 2020. Other literature has found respiratory infections, pharyngitis, and fever to be the top diagnoses in 2019.¹⁶ Our 2020 data appears to be similar to top diagnosis codes found in the literature, with other studies also finding fever and rash to be most common reasons for sick visits.¹⁶ Some categories of diagnoses varied through the 2020 pandemic, while others remained stable. For example, the number of visits for AOM and contagious illnesses was highest at the start of the pandemic before the implementation of social distancing measures. However, other diagnosis categories, such as GU complaints, remained stable across the months, likely because they were not affected by social distancing measures.

Interestingly, our study saw a decrease in psychiatric visits in the early part of the 2020 pandemic, appearing to mirror the seasonal trend seen in the same months in 2019. At baseline, the patients in our clinic, which serves predominately families with low income, experience many behavioral and psychological needs. Other studies have found significantly increased volumes in children presenting to pediatric emergency departments with mental-health related diagnoses.⁴ It is possible that we saw a lower volume of psychiatric visits because our study was early in the pandemic. It is also possible that this represents a difference in trends in primary care versus emergency visits. Further research is needed to evaluate psychiatric and behavioral visit trends specifically in pediatric primary care throughout the pandemic.

Telemedicine was utilized starting in March 2020, with some months having more than one-third of visits as telemedicine visits. The percentage of telemedicine visits varied by month, but this data shows how a pediatric practice, familiar with telephone triage but not telemedicine, quickly adapted to implementing telemedicine almost immediately after an executive order expanding access to telemedicine was issued. This data is similar to other reports in the literature

which show a steep drop-off of pediatric in-person visits in March 2020 with a rapid increase in telemedicine visits at the start of the pandemic.¹⁷ Our telemedicine volumes were highest in April and May of 2020 which reflects the months when the highest numbers of positive COVID-19 tests were reported in Rhode Island.¹⁸ Telemedicine volumes decreased from June to August while in-person visits increased compared to the first three months of the pandemic. Perhaps as numbers in the community decreased, families felt more comfortable bringing children into the office, and telemedicine visits decreased. The top three diagnosis categories for telemedicine visits were dermatologic, infectious, and allergic respectively. Other studies have found similar results, with high percentages of visits for dermatologic and respiratory system diagnoses, which is notable, as these concerns often necessitate a physical exam.¹⁷

Our study has several limitations. This study was a retrospective chart review of billing diagnosis codes only, thus we are limited by the information that providers documented in the medical record. Our infectious category was broad and included visit types such as fever and pharyngitis whereas other literature has separated these out in distinct categories, making direct comparisons between studies difficult. In addition, this study was performed at a large, urban academic medical center which serves predominately families with low income and may not be generalizable to other clinical settings such as private practices or more rural areas. Lastly, our study was conducted in a state which imposed restrictions early in the pandemic, and thus it may not be generalizable to other settings or regions.

Further research is needed to better understand how these changes may have affected patient care as well as help determine best practices in managing patient flow during different phases of a pandemic while still maintaining access to quality care in a medical home.

CONCLUSION

This study analyzes how pediatric, outpatient acute care was affected by the COVID-19 pandemic. There were decreased sick visits in all diagnosis categories in 2020 compared to 2019. Our findings suggest that pediatricians should continue to encourage families to seek timely and appropriate care for illnesses. In addition, our study highlights the evolving role of telemedicine in pediatric urgent care.

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