

IMPACT OF THE COVID-19 PANDEMIC ON PEDIATRIC AMBULATORY ANTIBIOTIC USE IN AN ACADEMIC HEALTH SYSTEM

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ABSTRACT

BACKGROUND: It is unclear how the COVID-19 pandemic has impacted outpatient pediatric antibiotic prescribing.

METHODS: We compared diagnoses and antibiotic prescription rates for children pre- vs post-COVID-19 in 5 ambulatory settings affiliated with Vanderbilt University Medical Center: emergency department (ED), urgent care clinics (including pediatric-only after-hours clinics [AHCs] and walk-in clinics [WIC] for all ages), primary care clinics (PCC), and retail health clinics (RHC). Time periods were pre-COVID 3/1/19 – 5/15/19 (P1); and post-COVID 3/1/20 – 5/15/20 (P2). Diagnoses and percent of encounters with an antibiotic prescription were analyzed by encounter (in-person vs telemedicine [TMed]), clinic and provider type. We also interviewed 16 providers about perceived COVID-19 impact on pediatric ambulatory prescribing. Student's T and chi-2 tests were used as appropriate.

RESULTS: The number of pediatric ambulatory visits was 16671 in P1 and 7010 in P2. There were no TMed visits in P1 vs 188 in P2 (2.7% of total P2 visits); 186 (99% of TMed visits) were in PCC. In all settings, the number of encounters was lower in P2 (32%) than in P1 (38.2%) ($p < 0.001$) overall and in all settings except RHCs. Only 14 (7.4%) TMed visits resulted in an antibiotic prescription. There were no differences in antibiotic prescribing rates by provider type. Diagnoses varied significantly between periods in all clinic types except the ED, with non-infectious diagnoses being higher in P2 vs P1. Providers felt that COVID-19 led to fewer but sicker patients presenting for care, and variable impact on antibiotic prescribing.

CONCLUSION: The proportion of encounters with non-infectious diagnoses increased and antibiotic prescribing rates decreased significantly in all pediatric ambulatory settings post-COVID-19 except RHCs. Almost all TMed encounters occurred in the primary care setting, and few resulted in an antibiotic prescription. Providers felt they saw fewer patients and higher acuity of illness post COVID-19.

BACKGROUND / OBJECTIVE

In response to the COVID-19 pandemic, many ambulatory practices in the United States cancelled or converted visits to telemedicine. Social distancing and masking decreased transmission of respiratory viral illnesses. We sought to assess the impact of these measures on ambulatory pediatric antibiotic prescribing.

METHODS

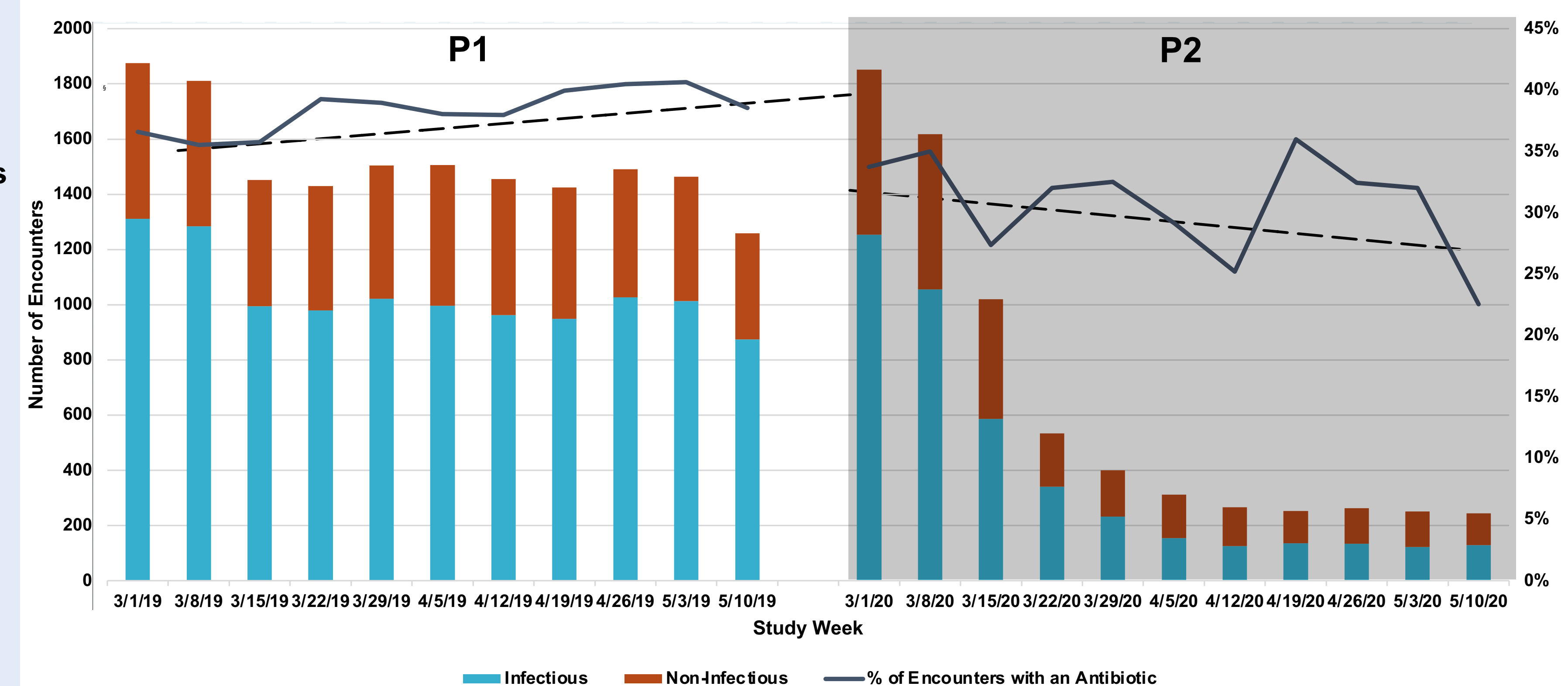
- Single center pre-post study of electronically prescribed pediatric prescriptions & one-on-one qualitative interviews
- P1: Pre-pandemic (March 1 – May 15, 2019)
- P2: Early pandemic (March 1 – May 15, 2020)
- 5 ambulatory settings affiliated with a pediatric academic tertiary care center:
 - Emergency department: 1 site, 47,500 visits/year, staffed by 111 MD, 74 trainees, 12 NPs, 1 PA
 - Pediatric after-hours clinics: 6 sites, 30,400 visits/year, staffed by 31 pediatricians
 - Primary care clinics: 4 sites, 84,700 visits/year, staffed by 203 pediatricians, 67 trainees, 5 PAs, 47 NPs
 - Retail health clinics: 14 sites, 14,900 pediatric visits/year, staffed by 57 NPs (mostly family medicine trained) and 3 PAs
 - Walk-in clinics: 10 sites, 26,400 pediatric visits/year, staffed by 56 MDs (mostly family medicine trained), 3 PAs and 88 NPs
- Encounter diagnosis: ICD-10 diagnosis associated with antibiotic prescription or primary encounter diagnosis if no antibiotic was prescribed. If multiple diagnoses, assigned to infectious group if any infectious diagnosis was made

Statistical Analysis: Student's t-test, chi² test and interrupted time series analysis; Stata/IC version 15.1 for MAC (College Station TX)

RESULTS

- Total encounters: 7010 in P2 vs 16671 in P1 ($p < 0.001$)
- Encounters for infectious diagnoses: P2: 4267/7010 (60.8%) vs P1: 11412/16671 (68.5%) ($p < 0.001$)
- Encounters with an antibiotic prescription: P2: 2240/7010 (32%) vs P1: 6373/16671 (38.2%) ($p < 0.001$)
- Infectious diagnosis encounters with an antibiotic prescription: P2: 1324/2943 (45%) vs P1: 3941/7471 (52.8%) ($p < 0.001$)

Figure 1. ENCOUNTER NUMBER, DIAGNOSIS TYPE AND ANTIBIOTIC PRESCRIPTION RATE THROUGHOUT THE STUDY



➤ Interrupted time series analysis of % of encounters with an antibiotic prescription (dashed line); p -value comparing slope in P1 vs P2 = 0.03

Figure 2. SELECTED THEMES AND QUOTES FROM INTERVIEWED PROVIDERS (N=16)

Decreased Census
(5 [31%] providers commented)

- "We haven't seen a lot of kids who need antibiotics lately" – MD in PCC
- "I have not seen as many infections right now because everybody's staying home with their own families. So their own germs are all at home with their own families." – NP in PCC

Stricter Triage (Provider and Patient Directed)
(6 [38%] providers commented)

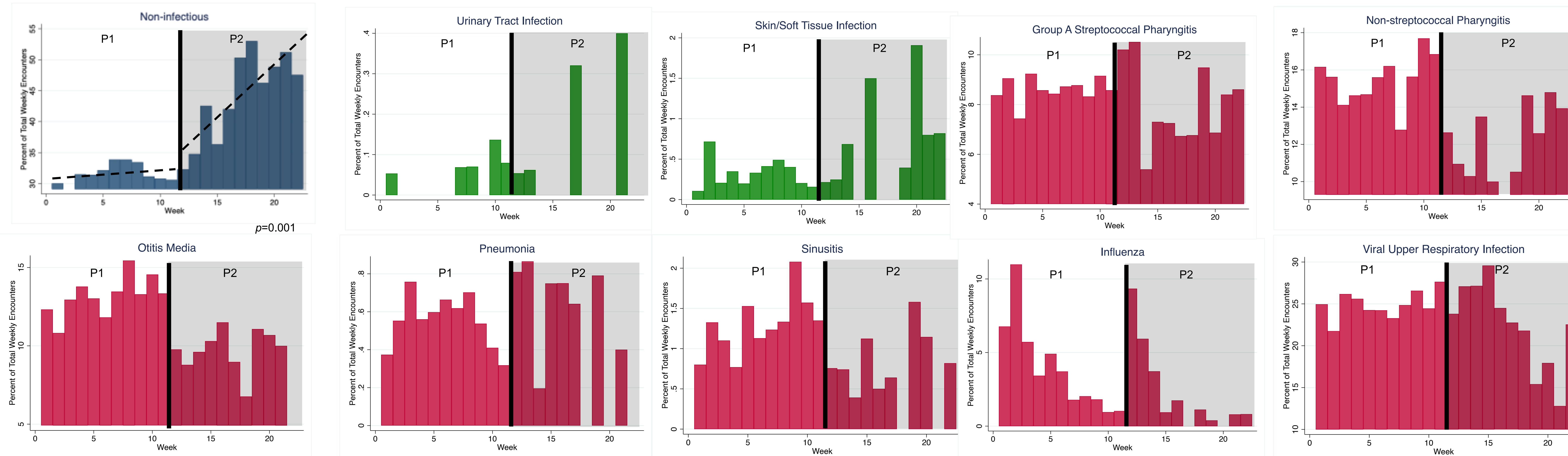
- "...people are scared to come in. They're only coming in if they feel like it's really serious or really bad." – MD in AHC
- "...they're probably a little bit scared to come into clinic. ...maybe this is teaching them that they don't need to come all the time when the kid has a runny nose and a cough" – NP in PCC
- "...maybe having family wait a little bit longer as far as watching symptoms before bringing them in." – MD in PCC

No Consistent Perceived Impact on Antibiotic Prescribing
(16 [100%] providers commented on the subject; no consistent theme)

- "I feel like my antibiotic prescribing has gone up with this, because patients are waiting to come in, until they are sick or they definitely have something that is bacterial" – NP at RHC
- "But I'm still not going to prescribe if I don't think it's necessary. It's just... even if they said they were willing to come back, I might be like, Yeah, take the safety net prescription." – MD in PCC
- [commenting on telemedicine] "So if they have URI symptoms and unilateral ear tugging and fever, we've been instructed to be a little bit more lenient with our antibiotic prescribing during this time." – NP in PCC

Abbreviations: MD = physician, NP = nurse practitioner, PCC = primary care clinic, AHC = after hours clinic, RHC = retail health clinics

Figure 3. PERCENT OF ENCOUNTERS PER WEEK BY SPECIFIC DIAGNOSIS



CONCLUSIONS

1. Significant reduction in outpatient infection-related visits and antibiotic prescribing for children after the start of the COVID-19 pandemic.
2. No decline in diagnosis and prescriptions for non-respiratory illnesses like urinary tract infections and skin/soft tissue infections.
3. Whether this trend will continue in the face of relaxing social distancing measures, ongoing community transmission of SARS-CoV-2 and the upcoming influenza season is unknown and warrants evaluation.

LIMITATIONS

- Short P2 time period, few providers interviewed
- Lack of generalizability to communities with different demographics, infection prevalence or mitigation strategies