



Changes in Outpatient Opioid Prescribing During the COVID-19 Pandemic: An Interrupted Time Series Analysis

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Abstract

Objectives: Changes in health care delivery during the COVID-19 pandemic may have impacted opioid prescribing. This study evaluated the impact of restrictions on in-person care on opioid prescribing in the outpatient setting. The hypothesis was that after restrictions to in-person care were implemented, there would be a reduction in the number of chronic and non-chronic opioid prescriptions. **Methods:** An interrupted time series analysis was conducted to compare the number of weekly opioid prescriptions between baseline (1/1/2019–3/14/2020), restriction (3/15/2020–6/6/2020), and reopening (6/7/2020–10/31/2020) periods at outpatient practices within a health system in Bronx, NY. Analyses were stratified by prescription type (chronic if the patient had been prescribed opioids for >90 days, or non-chronic). **Results:** For *chronic opioid prescriptions*, the week restrictions were implemented, there was an increase in the number of prescriptions compared to what was predicted if there had been no interruption (34.8 prescriptions, 95% CI: 8.0, 61.7). Subsequently, the weekly trend in prescribing was not different in the restriction period or in the reopening period compared to the previous time periods. For *non-chronic opioid prescriptions*, during the restriction period, the weekly trend in prescribing decreased compared to baseline (–5.0 prescriptions/week, 95% CI: –9.0, –1.0). Subsequently, during the reopening period, the weekly trend in prescribing increased compared to the restriction period (6.4 prescriptions/week, 95% CI: 2.2, 10.7). **Conclusions:** Despite abrupt restrictions on in-person care, chronic opioid prescriptions did not decrease, which is evidence that providers evolved to meet patient needs. Changes in non-chronic prescriptions are likely related to patients electing not to pursue care for acute pain or challenges with appointment availability.

Keywords

opioid, health services research, COVID-19, interrupted time series analysis, pain management

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Introduction

As a result of the COVID-19 pandemic's sudden surge in New York City in March 2020, multiple facets of healthcare delivery were disrupted as care pivoted from in-person visits to virtual platforms¹ and patients delayed or avoided medical settings to reduce exposure to the virus.² Medical providers and patients with chronic and acute pain had to quickly adapt to disruptions in continuity of care, cessation of treatments such as physical therapy, and postponing of elective procedures. Medical providers and patients also had to grapple with concerns about interrupted pharmaceuticals due to disruptions in manufacturing and shipping.^{3–5} Providers may have changed their opioid prescribing practices because of competing priorities, such as caring for

patients with COVID-19 or because of the introduction of telemedicine.¹

There was rapid development of new policies and procedures relating to opioid prescribing in the setting of the COVID-19 pandemic. For example, the Drug Enforcement Administration released emergency guidance on March 31,

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2020 indicating that in the absence of in-person medical evaluations, medical providers were permitted to continue prescribing opioids for patients established in care and to initiate opioid prescribing in telemedicine visits.⁶ Pain management experts including physicians, psychologists, and researchers published guidelines in the journals of *Pain Medicine* and *Anaesthesia* emphasizing the need for continuity of pain care, exemplified by recommendations to continue medications, maintain interdisciplinary pain management, and prioritize pain-relieving procedures.^{7,8} The New York City Department of Health issued guidance on opioid prescribing that included waiving requirements for “in-person assessments and urine drug testing for refills of stable medications,” and recommending continuation of long-term opioids rather than making changes such as tapering the dose or transitioning to a new medication.⁹ However, it is unknown if or how clinicians implemented these new guidelines.

This study investigated if opioid prescribing from outpatient medical sites changed after the temporary restriction and then after the reopening of in-person visits and elective procedures at a large academic medical center in Bronx, NY during the first COVID-19 surge in the U.S. The hypothesis was that after restrictions to in-person care were implemented, there would be a reduction in the number of chronic and non-chronic opioid prescriptions. It was expected that the number of prescriptions would return to pre-pandemic levels when in-person care resumed during the reopening period. Findings may have implications for patient outcomes, future policy, and guideline development for opioid prescribing using telemedicine and in the setting of public health emergencies.

Methods

An interrupted time series analysis (ITS) was conducted to evaluate opioid prescriptions between January 1, 2019 and October 31, 2020 at outpatient medical sites at Montefiore Medical Center (Montefiore), an academic medical center and integrated healthcare delivery system, in the Bronx, NY. Montefiore provides primary, specialty, urgent and emergency care in a network of outpatient practices and 4 hospitals. In the outpatient setting, there are over 250 000 unique patients; most patients (approximately 75%) are publicly insured by Medicaid and/or Medicare. This study was approved by the Montefiore Medical Center and Albert Einstein College of Medicine Institutional Review Board.

The Bronx, NY was the early epicenter of the COVID-19 crisis with the highest case rate in the US from March through June of 2020.^{10,11} During the height of the COVID-19 pandemic in New York, a statewide emergency was declared on March 7, 2020¹² and in-person visits and elective procedures at Montefiore were restricted or canceled on March 15, 2020. Outpatient practices transitioned to

telemedicine (telephone or video visits) for non-urgent care.¹³ Many outpatient providers were deployed to the inpatient wards to provide care for patients with COVID-19, creating challenges for continuity of care in outpatient settings.¹⁴ Based on state guidelines, as the number of cases of COVID-19 in the hospital declined, Montefiore resumed in-person outpatient care and elective procedures on June 8, 2020.¹²

The primary outcome was the number of opioid prescriptions per week from clinicians practicing at outpatient medical sites which includes primary care (eg, Internal Medicine, Family Medicine) and non-surgical specialties (eg, Oncology, Infectious Diseases, etc.). Prescription data were extracted from the Epic electronic medical record system. Generic drug names were used to identify oral, suppository, and transdermal forms of codeine, fentanyl, hydrocodone, hydromorphone, methadone, morphine, oxycodone, oxymorphone, or tramadol. Buprenorphine was excluded as it is used primarily for treatment for opioid use disorder. Each prescription was classified as either a: chronic opioid prescription if the patient had opioid prescriptions from Montefiore covering >90 of the previous 183 days, or non-chronic opioid prescription. Three periods were defined: baseline: 63 weeks between January 1, 2019 and March 14, 2020, restrictions: 12 weeks between March 15, 2020 and June 6, 2020, reopening: 21 weeks between June 7, 2020 and October 31, 2020. The baseline time period includes the same months as the restriction and reopening time periods to control for potential seasonal trends.

An ITS analysis was used to evaluate changes in opioid prescriptions after 2 interruptions: the onset of restrictions (March 15, 2020) and the onset of reopening (June 7, 2020). ITS is a study design used to evaluate health intervention outcomes where there is a clear differentiation of the pre-intervention period and the post-intervention period.¹⁵ Two separate ITS regression models were performed, 1 for chronic and 1 for non-chronic opioid prescriptions. Each model tested for both the (1) immediate change in the number of prescriptions, defined by the difference between the observed number of prescriptions during the first week after the interruption and the predicted number of prescriptions if there had been no interruption; and the (2) slope change, defined by the difference between the slope of the number of prescriptions per week within each period compared to the slope in the previous period. Models included the first and second order autoregressive terms to account for autocorrelation of the dependent variable over time.

Results

During the entire study period, from January 1, 2019 to October 31, 2020 there were 67 263 opioid prescriptions sent from Montefiore outpatient medical sites. Of these, 46 096 (68.5%) were chronic opioid prescriptions sent for 3713 unique patients and 21 167 (31.5%) were non-chronic opioid

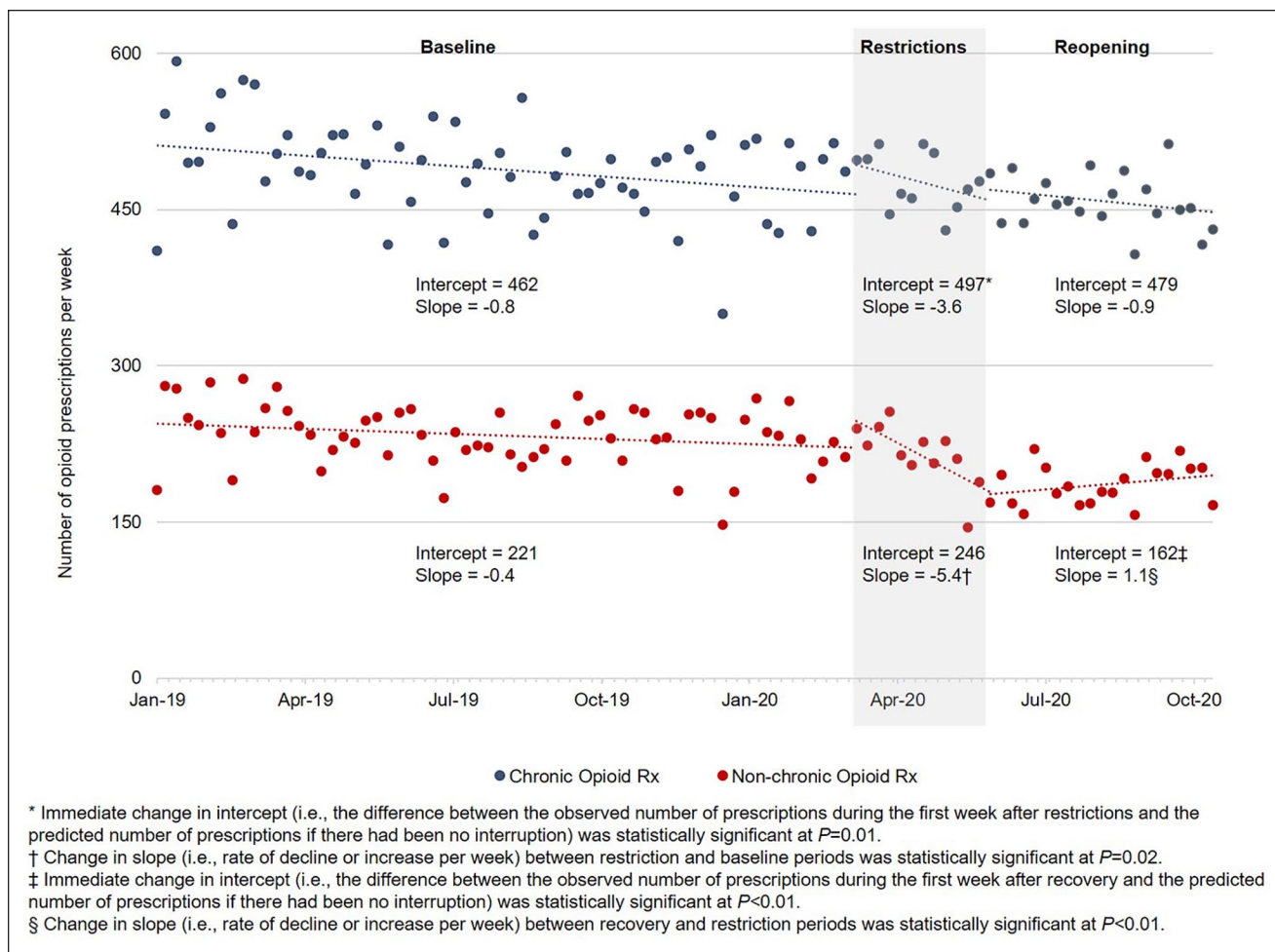


Figure 1. Weekly chronic and non-chronic opioid prescriptions from outpatient medical sites during baseline, restrictions, and reopening periods related to the COVID-19 pandemic.

prescriptions sent for 10213 unique patients. Figure 1 depicts the number and the trend of chronic and non-chronic opioid prescriptions per week during the 3 periods.

During the baseline period, chronic opioid prescriptions were decreasing (slope -0.8 prescriptions per week; 95% CI: 1.1, -0.5) (Table 1). The week restrictions were implemented, there was an immediate increase by 7.5% compared to predicted (34.8 prescriptions, 95% CI: 8.0, 61.7). There were no other significant changes in chronic opioid prescriptions during the remainder of the study period.

During the baseline period, non-chronic opioid prescriptions were decreasing (slope -0.4 prescriptions per week; 95% CI: -0.7 , -0.1). The week restrictions were implemented, there was no significant immediate change. During the restriction period, there was a slope decrease compared to baseline (-5.0 prescriptions per week; 95% CI: -9.0 , -1.0). The week reopening was implemented, there was an immediate decrease by 34.1% compared to predicted (-83.9 prescriptions, 95% CI: -125 , -38.8). During the reopening

period, there was a slope increase compared to the restriction period (6.4 prescriptions per week, 95% CI: 2.2, 10.7).

Discussion

At a large academic medical center in New York City, COVID-19 restrictions that limited in-person visits and elective procedures and the reopening of routine care were accompanied by significant changes in opioid prescribing from outpatient medical sites. To our knowledge, this is the first study describing changes in opioid prescribing during the COVID-19 pandemic. Unexpectedly, despite appointment limitations, chronic opioid prescriptions, modestly increased immediately after restrictions were implemented and then remained unchanged. As expected, non-chronic prescriptions, likely for acute pain, decreased during restrictions and increased during reopening. Many of the emergency measures, regulations, and waivers involving provision of healthcare via telemedicine and opioid

Table 1. Interrupted Time Series Regression Analyses of Chronic Opioid Prescriptions Per Week and Non-Chronic Opioid Prescriptions Per Week Evaluating the Immediate Change and Slope Change Between the Baseline Period and Restrictions Period and Between the Reopening and Restrictions Period.

Baseline period	Restriction period		Recovery period		Change associated with restrictions			Change associated with reopening					
	Intercept (95% CI)	Slope (95% CI)	Intercept (95% CI)	Slope (95% CI)	Immediate change (95% CI)	Slope change (95% CI)	P value	Immediate change (95% CI)	Slope change (95% CI)	P value			
Chronic opioid Rx per week													
462 (451, 472)	-0.8 (-1.1, -0.5)	497 (456, 538)	-3.6 (-7.4, 0.2)	479 (418, 540)	-0.9 (-3.2, 1.4)	34.8 (8.0, 61.7)	.01*	-2.8 (-6.5, 1.0)	.16	-18.1 (-60.1, 24.0)	.4	2.6 (-1.3, 6.6)	.20
Non-chronic opioid Rx per week													
220 (209, 232)	-0.4 (-0.7, -0.1)	246 (218, 274)	-5.4 (-9.4, -1.4)	162 (121, 203)	1.1 (-1.2, 3.3)	25.4 (-2.8, 53.7)	.08	-5.0 (-9.0, -1.0)	.02*	-83.9 (-129.0, -38.8)	<.001*	6.4 (2.2, 10.7)	.004*

*Statistically significant values are defined as P value <.05.

prescribing practices are expected to be reversed after the pandemic.⁶ Thus, there is an urgent need to study how the changes we found may have impacted chronic and acute pain, functional outcomes, and prescription-opioid related harms.^{16,17}

Changes in chronic opioid prescribing were likely due to providers balancing risks of opioid prescriptions with new risks associated with the COVID-19 pandemic. For example, providers may have prescribed refills for chronic opioid prescriptions earlier than usual or provided extra prescriptions if they believed that patients would lose access to care or face drug shortages.²⁻⁴ Providers may also have prescribed more liberally if they believed doing so might reduce the likelihood that a patient would seek emergency care for pain, in order to reduce exposure to COVID-19 and prevent ED overcrowding. The initial increase during restrictions persisted, which could reflect prescribers being more willing to continue prescribing opioids without visits given the extenuating circumstances of the pandemic. These practices are consistent with guidelines from professional organizations to continue treatment particularly when there were no changes in patients' pain or function⁷⁻⁹ as disruptions in chronic opioid prescriptions can result in opioid withdrawal symptoms and uncontrolled pain.^{18,19} For non-chronic opioid therapy, prescription changes likely reflect changes in patients seeking care and appointment availability.

This study had several limitations. It was conducted in a large urban healthcare system at the first epicenter of the COVID-19 pandemic and our findings may not be generalizable to other institutions in different environments or which experienced a surge in COVID-19 patients later in the pandemic. Patients' indications for opioid medications were not available, limiting the ability to interpret reasons for changes in prescribing practices. Future research can explore providers' experiences with opioid prescribing during the 3 time periods.

During the COVID-19 pandemic, immediately after restrictions to in-person care were implemented, chronic opioid prescriptions from outpatient medical practices unexpectedly increased modestly and then returned to the baseline decreasing trend. While it was hypothesized that they would decrease, this finding is reassuring for patients receiving opioid therapy for chronic pain as abrupt discontinuation or tapering of long-term opioid therapy is associated with negative outcomes. As anticipated, non-chronic prescriptions decreased during restrictions when fewer patients sought care for acute pain and there were health system limitations in appointment availability. As expected, non-chronic prescriptions increased during the reopening period. Studies are needed to determine the impact of restrictions on in-person visits and elective procedures on patient outcomes related to pain control and opioid management.

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Dr. Starrels has received research and travel support from the Opioid Post-Marketing Requirement Consortium for an observational study of the long-term risks of opioid medications. Dr. Starrels has been a speaker for SCOPE of Pain. She was a core expert advising the Centers for Disease Control and Prevention on developing the 2016 Guideline for Prescribing Opioids for Chronic Pain. Dr. Starrels has served as consultant for the New York City Department of Health and Mental Hygiene and consultant for Venebio Group, LLC. These sources had no involvement regarding this publication.

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