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Understanding Clinician Decision-Making Around Opioid Prescribing

A dissertation submitted in partial satisfaction of the requirements for the degree

Doctor of Philosophy in Health Policy and Management

by

Michelle Sophie Keller

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ABSTRACT OF THE DISSERTATION

Understanding Clinician Decision-Making

Around Opioid Prescribing

by

Michelle Sophie Keller

Doctor of Philosophy in Health Policy and Management

University of California, Los Angeles, 2019

Professor Jack Needleman, Co-Chair

Professor MarySue Heilemann, Co-Chair

This dissertation examines how clinicians are making decisions about prescribing opioids in the midst of a public health crisis. In the first paper, I used a qualitative study design to understand how, why, and when clinicians use risk mitigation strategies when prescribing opioids. For three risk mitigation strategies – the opioid agreement, urine drug testing, and risk screening checklists – I identified two groups of clinicians: Adopters, who found them useful and valuable and Non-adopters, who found them awkward and disruptive. In the second paper, I examined how clinicians made decisions about assuming new patients' existing opioid prescriptions and identified three approaches: the *Staunch Opposers*, who were highly averse to continuing opioid prescriptions for new patients; the *Cautious and Conflicted Clincians,* who felt uneasy about prescribing opioids, but were willing to manage new patients' prescriptions if the patient was perceived as trustworthy and if the dose and medication type fell within their comfort zone; and the *Rapport Builders*, who were the most willing to assume a new patient's opioid prescription, even if the prescription was for a high dose. In the third study, I examined a sample of visits of patients seen by primary care clinicians for low back

pain from 2013-2017 and analyzed whether receipt of an opioid prescription was associated with comorbidities that would indicate the prescription was potentially appropriate or inappropriate. I found that visits for which patients had selected NSAID contraindications, including kidney disease and concurrent or long-term use of anticoagulants or antiplatelet medications, had higher odds of the receipt of an opioid prescription, reflecting potentially appropriate prescribing. However, visits where patients had relative contraindications for opioids, such as concurrent benzodiazepine prescriptions or a history of substance use disorder, had significantly elevated odds of opioid receipt, reflecting potentially inappropriate prescribing. Findings from this dissertation expand and extend a conceptual model for decision-making around prescribing. I identified several new constructs that may influence prescribing, including (1) the nature of the patient-clinician relationship, (2) the management of risks to both the patient and clinician, (3) ethical considerations, and (4) the prescriber's identity and role as a clinician.

The dissertation of Michelle Sophie Keller is approved.

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Refereed Journal Articles

1. Goud A, Kiefer E, **Keller MS,** Truong L, SooHoo S, Riggs R. Calculating Maximum Morphine Equivalent Daily Dose from Prescription Directions for Use in the Electronic Health Record: A Case Report. *JAMIA Open;* in press.

2. Herzig SJ, Calcaterra SL, Mosher HJ, Ronan MV, Van Groningen N, Shek L, Loffredo A, **Keller M**, Jena AB, Nuckols TK. Safe Opioid Prescribing for Acute Non-Cancer Pain in Hospitalized Adults: A Systematic Review of Existing Guidelines. *J Hosp Med* 2018; in press.

3. **Keller MS,** Mosadeghi S, Cohen ER, Kwan J, Spiegel BMR. Reproductive Health and Medication Concerns for Patients With Inflammatory Bowel Disease: Thematic and Quantitative Analysis Using Social Listening. *J Med Internet Res.* 2018; 20(6):e206.

4. Noah B, **Keller MS**, Mosadeghi S, Stein L, Johl S, Delshad S, Tashjian V, Lew D, Kwan J, Jusufagic A, Spiegel BMS. Impact of Remote Patient Monitoring on Clinical Outcomes: An Updated Meta-Analysis of Randomized Controlled Trials. *npj Digital Medicine.* 2018; 1(2).

5. Heekin A, Kontor J, Sax H, **Keller MS**, Wellington A, Weingarten S. Choosing Wisely Clinical Decision Support Adherence and Associated Inpatient Outcomes. *American Journal of Managed Care.* 2018; 24(8):361-366.

6. Dhillon NK, Francis SE, Tatum JM, **Keller MS,** Barmparas G, Gewertz BL, Ley EJ. Adverse Effects of Computers During Bedside Rounds in a Critical Care Unit. *JAMA Surg.* 2018. doi:10.1001/jamasurg.2018.1752

7. Brandal D, **Keller MS**, Lee C, Grogan T, Fujimoto Y, Gricourt Y, Yamada T, Rahman S, Hofer I, Kazanjian K, Sack J, Mahajan A, Lin A, Cannesson M. Impact of Enhanced Recovery After Surgery and Opioid-Free Anesthesia on Opioid Prescriptions at Discharge From the Hospital: A Historical-Prospective Study. *Anesth Analg.* 2017; 125(5):1784-1792.

8. **Keller MS,** Park HJ, Cunningham ME, Fouladian JE, Chen M, Spiegel BMRPublic Perceptions Regarding Use of Virtual Reality in Health Care: A Social Media Content Analysis Using Facebook. *J Med Internet Res.* 2017; 19(12):e419.

9. Almario CV, **Keller MS**, Chen K, Lasch K, Ursos L, Melmed GY, Spiegel BMR. Optimizing Selection of Biologics in Inflammatory Bowel Disease: Development of an Online Patient Decision Aid Using Conjoint Analysis. *American Journal of Gastroenterology.* 2018 Jan; 113(1):58-71.

10. Martinez, B., Dailey, F., Almario, C.V., **Keller, M.S.,** Desai, M., Dupuy, T., Mosadeghi, S., Whitman, C., Lasch, K., Ursos, L. and Spiegel, B.M., 2017. Patient understanding of the risks and benefits of biologic therapies in inflammatory bowel disease: insights from a large-scale analysis of social media platforms. *Inflammatory bowel diseases,* 23(7), pp.1057-1064.

11. Roby D, Jacobs K, Watson G, Bronshteyn A, Graham-Squire D, **Keller M**. Health care reform in the U.S.: An analysis of implementation of the Affordable Care Act in California. *BMC Health Services Research.* 2014, 14 (Suppl 2:)P 2013.

Policy Briefs and Evaluations

1. Pourat N, Meng Y, Leibowitz A, Needleman J, Chen X, Roby DH, Hadler MW, Salce E, Nelson K, Wynn A**, Keller M**, and Kominski GF. Final Evaluation Report of California's Delivery System Reform Incentive Payments (DSRIP) Program. Los Angeles, CA: UCLA Center for Health Policy Research, November 2015.

2. Pourat N, Kominski GF, Roby DH, Meng Y, Needleman J, Leibowitz A, Salce E, Bronshteyn A, Hadler M, Chen X, Lo N, Castro M, Nelson K, Wynn A, Purington N, **Keller M**, and Asuncion D. *Interim Evaluation Report on California's Delivery System Reform Incentive Payments (DSRIP).* Los Angeles, CA: UCLA Center for Health Policy Research, September 2014.

CHAPTER 1: INTRODUCTION

The prescription opioid epidemic has evolved significantly since its inception in the 1990s. First-time prescriptions have decreased steadily since 2012 (1), and the overall rate of prescriptions per 100 persons has also declined in recent years (2). The proportion of high-dose and long-duration opioid prescriptions has also decreased in the past decade (1, 2). Since 2012, there has also been an important reduction in the percentage of clinicians initiating opioid therapy in patients not currently on opioids (1). Additionally, overdose deaths associated with prescription opioids have plateaued over the last five years (3). Yet the news is not all positive. Since 2013, a new wave of drug overdose death rates has begun, with illicit fentanyl driving up deaths dramatically (3). While the overall rate of prescriptions has declined, individuals who were started on prescription opioids in previous years when prescribing was more liberal have continued receiving prescriptions and many are now chronic opioid users (2). Individuals who started taking opioids for acute or chronic pain may now have developed substance use disorder or developed long-term opioid use. Substance use disorder can begin with a legitimate prescription: four in five new heroin users start by misusing prescription opioids (4).

Policies and guidance related to opioid prescribing continue to evolve as well. In 2016, in response to the opioid epidemic, the Centers for Disease Control and Prevention (CDC) issued guidelines for opioid prescribing (5). The CDC guidelines included recommendations that clinicians assess risks and benefits of opioids for each patient, evaluate opioid-related harms, reduce higher doses, and prescribe shorter courses of opioids. States responded both to the guidelines and the opioid epidemic with an onslaught of new legislation, requiring providers to check state databases of controlled substances, imposing limits on first-time prescriptions, and requiring the prescription of naloxone to any patient on chronic opioid therapy (6). While well intentioned, policies and guidelines developed in response to the opioid epidemic may be having unintended consequences. A

2019 report detailing the findings of a multidisciplinary panel of experts identified a variety of challenges associated with implementing the 2016 CDC guidelines. The panel identified that recent policies could be leading prescribers to cease prescribing opioids, limit doses without considering individual patient needs, begin involuntary opioid tapers, and enforce inflexible prescription duration limits (5, 7). In an April 2019 commentary in the *New England Journal of Medicine,* the CDC guideline authors also noted how recent policies may have gone beyond the original guidelines (8). Given the risks of prescription opioids and the current public health crisis of prescription opioid overdoses, decision-making around opioid prescribing has become increasingly complex and is not well understood. As the CDC guideline authors wrote in their 2019 perspective: "We need better evidence in order to evaluate the benefits and harms of clinical decisions regarding opioid prescribing" (8).

Thus, this dissertation aims to examine how clinicians are making decisions about prescribing opioids in this fraught and evolving environment. In the first paper, I use a qualitative study design and constructive grounded theory methodology to examine how and why clinicians use risk mitigation strategies recommended by the 2016 CDC guidelines such as opioid agreements, urine drug testing, and risk assessment checklists. I explore why certain clinicians are hesitant to use the strategies while others have eagerly adopted them. In the second paper, I also use a qualitative research design and explore how clinicians make decisions about assuming new patients' existing opioid prescriptions. This study touches upon concerns articulated by the authors of the CDC guidelines in their recent *NEJM* commentary regarding whether clinicians may be refusing to prescribe opioids or manage patients already on long-term opioid therapy. In the third study, I examine a sample of visits of patients seen by primary care clinicians for low back pain from 2013-2017 and analyze whether receipt of an opioid prescription is associated with comorbidities that would indicate the prescription is potentially appropriate or inappropriate. Specifically, I analyze

whether patients with contraindications for NSAIDs are more likely to receive an opioid prescription. I also examine whether patients with relative contraindications for opioids are less likely to receive an opioid prescription.

Together, these papers demonstrate how clinicians are grappling with the various decisions surrounding opioid prescribing in this difficult era, including how and whether they assess risk of misuse or abuse, whether to assume a new patient's existing opioid prescriptions, and how to decide whether an opioid prescription might be appropriate based on a patient's comorbidities and prescriptions. The findings can inform policies at the health system and regulatory levels, aiding administrators and policymakers with balancing the risks and harms of opioids with the consequences of these policies for patients and clinicians.

CHAPTER 2: Study 1 : How do clinicians of different specialties perceive and use opioid risk mitigation strategies? A qualitative study

ABSTRACT

Background: In response to the opioid epidemic, states and health systems are encouraging clinicians to employ four risk mitigation strategies: opioid agreements, state-based prescription database management programs, urine drug tests, and screening checklists. These strategies are aimed at assessing a patient's risk for opioid misuse or abuse. The objective of this study was to understand how clinicians perceived and used different opioid risk mitigation strategies and to identify barriers to their implementation.

Methods: We used constructivist grounded theory methodology to guide study design and qualitative analysis. We conducted interviews with clinicians in multiple specialties about their perceptions and use of the four risk mitigation strategies from 2016-2018. Clinicians were affiliated with one academic medical center.

Results: Our sample included 32 clinicians of different specialties who prescribe opioid medications in the outpatient setting, including 21 primary care physicians (17 internal medicine physicians, three family medicine physicians, and one primary care nurse practitioner), 6 clinicians with specialized training in pain (three anesthesiologists, two dentists with additional training in pain medicine, and one physical medicine and rehabilitation physician), and 6 other specialists (four rheumatologists and two neurologists). Some internists and family practice physicians had both primary care practices and worked in the urgent care setting. Most clinicians used the state-based prescription database program to check on patients' previous prescriptions. For the other three risk mitigation strategies – the opioid agreement, urine drug testing, and risk screening checklists – we identified two approaches: Adopters, who found them useful and valuable and the Non-adopters, who found them awkward and disruptive. Adopters were primarily clinicians who typically see patients episodically:

pain specialists and urgent care clinicians. Adopters found strategies helpful in reducing the need to rely on gut feelings, setting limits with patients, and having objective evidence of misuse or abuse. Clear protocols on when and how to use the strategies also facilitated their use. Non-adopters were largely primary care and rheumatologists, clinicians who often have long-term relationships with patients. Non-adopters perceived the strategies as interfering with the clinician-patient relationship, superfluous given their existing patient relationships, or unfair to patients. Non-adopters in the primary care setting also cited lack of time and resources to successfully implement the strategies.

Conclusions: In settings where long-term relationships are important and valued, such as primary care and rheumatology, clinicians were less likely to use risk mitigation strategies perceived as disruptive to the patient-clinician relationship. In settings where care is episodic, such as urgent care and pain medicine, clinicians were more likely to embrace the risk assessment strategies, as they helped clinicians set limits and use objective evidence to document misuse or abuse. Risk mitigation strategies tailored to different settings may improve adoption and use.

INTRODUCTION

Identifying misuse and abuse of prescription opioids is important for the prevention of substance use disorders and drug overdoses (1, 2). Four in five new heroin users start by misusing prescription opioids (3) and misuse of opioids can lead to accidental overdose or death (4). In 2016, of the 63,632 deaths from drug overdose, 66.4% involved opioids, including prescription and illicit opioids (5). The opioid crisis has prompted federal agencies, state policymakers, and physician societies to promote four major strategies to identify individuals at high risk for opioid misuse or addiction (1, 2, 6). Risk mitigation strategies include opioid agreements, state Prescription Database Management Programs (PDMPs), urine toxicology testing, and risk assessment tools. Opioid agreements, sometimes referred to as pain agreements or opioid contracts, are documents listing conditions to which patients must agree in order to receive opioid prescriptions. These conditions can include random urine drug tests, pill counts, and the use of only one prescriber and pharmacist. PDMPs are state-based databases documenting the prescription and dispensation of controlled substances that can be accessed by clinicians and pharmacists. These databases can assist clinicians and pharmacies in identifying individuals receiving large quantities of opioids from multiple sources (7). Urine toxicology tests are used to detect whether the patient is taking prescription opioids as indicated and/or to screen for the use of illicit drugs such as cocaine or methamphetamines (8). Risk assessment checklists include the Opioid Risk Tool and other checklists aimed at estimating a patient's risk for misuse or abuse (9).

The evidence on whether these risk mitigation strategies are effective in ultimately decreasing patients' risk of misuse, addiction, or overdose is limited and often mixed. A systematic review found limited evidence that opioid agreements and urine drug tests reduce opioid misuse (10). Despite limited evidence of their effectiveness, federal agencies, states, physician societies, and health organizations are promoting the use of these strategies, building them into quality

improvement measures and state legislation (2, 6, 10-14). In Table 1, we summarize the various risk mitigation strategies, the known evidence base, and available information on their use and implementation. Given the widespread efforts to implement these strategies, understanding perceptions about them and their on-the-ground use can inform efforts to improve their effectiveness and use.

Previous studies have analyzed the use of these risk mitigation strategies independently, examining the use of PDMPs, opioid agreements, or urine drug tests in the emergency department and primary care settings (15-19); however, less is known about how clinicians use these strategies collectively, substituting or favoring one risk mitigation strategy for another. Moreover, the majority of studies have focused on the use of these strategies in the primary care and emergency department settings; very few have examined their use in outpatient anesthesiology, neurology, and rheumatology clinics. Comparing and contrasting how clinicians who prescribe opioids in different settings and specialties use these strategies can provide insights into common barriers to their use and highlight areas where implementation and use has been most effective.

The objective of this study was to examine perceptions and use of these four risk mitigation strategies among a sample of clinicians affiliated with one academic medical center in a large metropolitan area. We analyzed use of the strategies among different clinician specialties to understand commonalities or differences in their implementation and use. Specifically, our research questions were: (1) How do clinicians in varying outpatient specialties and settings perceive these four opioid risk mitigation strategies? (2) What are barriers and facilitators perceived by clinicians in the implementation of these strategies? (3) Do these barriers and facilitators vary by clinical setting (e.g. primary care vs. outpatient anesthesiology)?

METHODS

Study Design

To understand how clinicians perceived and used risk mitigation strategies, we conducted in-depth interviews with clinicians of different specialties affiliated with a medical center from 2016-2018. Clinicians were offered $250 to participate. During the study period, use of the risk mitigation strategies was voluntary. We used constructivist grounded theory (CGT) methodology to guide data collection and analysis (20). Participant interviews were focused on obtaining detailed, descriptive data. We used a combination of inductive and deductive techniques to analyze the data, which involved moving iteratively between collecting, reflecting upon, and analyzing data. Inductive techniques involved creating initial codes that defined and labeled participants' views and actions (20). During this stage, we examined study participants' actions and statements closely, explored tacit assumptions, and deconstructed how certain events took place (20). Deductive techniques involved identifying initial codes that were more significant or frequently occurring and using these codes to sift and sort through the rest of the data (20, 21).

Study Setting and Participant Selection

This study took place in various outpatient settings across a large metropolitan area, including several primary care clinics, a multidisciplinary pain center, academic medical center departments, and private specialty practices. To recruit study participants, we emailed all clinicians affiliated with an academic medical center in the ambulatory setting who prescribe opioid medications for chronic pain or who treat chronic pain patients, including primary care/urgent care physicians and nurse practitioners, outpatient anesthesiologists, dentists who focus on pain medicine, physical medicine and rehabilitation physicians, rheumatologists, and neurologists. We excluded surgeons and emergency department physicians, as guidelines regarding opioid prescribing and use of the risk mitigation strategies for these clinicians are different from other outpatient clinicians and thus we felt they fell outside the scope of this study. We interviewed clinicians working in private practice, Health Maintenance Organization (HMO) medical groups, and faculty

settings. Clinicians interested in participating in the research were told that the interviews were focused on clinical decision-making around opioid prescribing. The study was reviewed and approved by the academic medical center's Institutional Review Board.

Data Collection

We developed a semi-structured interview guide for the first set of pilot interviews, which was refined for subsequent interviews as we analyzed the initial data according to CGT methodology (20). The interview guide (see Appendix 1) covered broad topics including the clinician's approach to treating chronic pain and acute pain; discussions about local, state, and health system guidelines; and communication with patients about opioid medications. We also specifically asked questions about perceptions and use of the opioid risk mitigation strategies. Interviews lasted 45 to 120 minutes. We audio-recorded the interviews and they were transcribed verbatim by a professional transcription service. We wrote fieldnotes to record observations in the field and preliminary memos to describe potentially important preliminary codes. We reviewed the transcripts and checked them for accuracy based on the audio recordings before analysis.

Data Analysis

Following CGT methodology, there was no *a priori* codebook or theme identification; all codes and categories were derived from the data. We gained analytic direction for our study after coding the first 10 interviews using line-by-line process coding; thus, each line was coded using a gerund to describe the action taking place in each line of the transcript (e.g. *believing that the opioid agreement does not benefit patient*). (22). At this point, we identified the most frequently occurring and significant codes. Then, we elevated these initial codes to focused codes, which are more selective and conceptual than line-by-line codes. Using these focused codes, we conducted further coding of transcripts through an iterative process; if new codes were identified in a subsequent transcript during the coding process, we re-read and re-coded the previously coded transcripts as needed (20,

23). All subsequent transcripts after the tenth were coded using the focused codes as a guide using Dedoose (version 8.0.42, SocioCultural Research Consultants, LLC) (20).

We analyzed the data identified with focused codes by using the various constant comparison techniques described in Corbin and Strauss (2008). For example, we contrasted how clinicians of different specialties and in different clinical settings used the risk mitigation strategies. We examined how their training, relationships with patients, perceptions of the opioid epidemic, and past experiences shaped their views. We also compared clinicians' own descriptions of why and whether they used the strategies with different patients or with patients with whom they had different patient-clinician relationships (e.g. new patients vs. established patients).

RESULTS

Our sample included 32 clinicians of different specialties who prescribe opioid medications in the outpatient setting, including 17 internal medicine physicians, three family medicine physicians, one primary care nurse practitioner, four rheumatologists, two neurologists, three anesthesiologists, two dentists with additional training in pain medicine, and one physical medicine and rehabilitation physician (Table 2). Four primary care clinicians practiced in both the urgent care and primary care settings. Most of our clinician sample practiced within an HMO group (53%) or private practice (25%); several clinicians practiced in multiple settings (had both a private practice and were part of the HMO group, for example). Our sample included clinicians with a wide range of years of practice, ranging from clinicians recently out of residency to clinicians who had been practicing 40 years. To protect the identities of study participants, we have obscured their gender in this paper.

Several of our interviews included clinicians working in the same practice group affiliated with an HMO with several locations in an urban area. The group is composed of approximately 100 clinicians, all of whom see primarily privately insured or Medicare patients. During our study period, clinicians in this HMO group indicated that their group was beginning a practice-wide

implementation process of the opioid agreement, urine toxicology testing, and the PDMP. In contrast, anesthesiologists and dentists practicing in the center's pain clinic reported integrating the strategies several years prior.

Adopters of the risk mitigation strategies were primarily urgent care clinicians and pain specialists, including anesthesiologists and dentists with a specialty in pain medicine. Adopters found the risk mitigation strategies to be helpful in treating all patients equally, setting limits with patients, and providing objective evidence of abuse or misuse. Adopters in the pain medicine setting also noted that existing organizational protocols and resources facilitated their use of the strategies (See Table 3).

The majority of Non-adopters of the strategies were primary care clinicians and non-pain specialty clinicians, including rheumatologists and neurologists. Non-adopters were concerned that three of the strategies – the opioid agreement, urine drug test, and risk screening checklists – would disrupt the patient-clinician relationship, were superfluous to actions they were already taking to prevent misuse, were unbeneficial to patients, and required difficult conversations about substance use and sexual abuse. The PDMP was viewed as less disruptive than the other strategies and more widely used among this group. Non-adopters in the primary care setting who viewed the strategies positively cited lack of time, resources, and financial incentives to implement the strategies.

1. Reasons why Adopters embraced the risk mitigation strategies

1.1 Treated patients equally

Adopters reported that they felt using the strategies on all patients was more fair, as this reduced or eliminated the need to trust gut feelings. For these clinicians, the strategies provided concrete, objective evidence and reduced the possibility of falsely accusing a patient of drug-seeking or overlooking a patient at high risk for overdose or misuse. One family practice clinician noted that

they used the strategies because they had been "taught that you can't tell the book by the cover." They continued:

> So it's actually if you don't have that heightened alert for every patient but you have to be also non-judgmental and sympathetic… I think that's where it helps to have these uniform rules like I check the [state PDMP] almost every time, pretty much every time. I don't assume. I do that urine tox screen and look to see that it's in the urine what you're prescribing.

1.2 Facilitated with setting boundaries

Adopters often noted the risk mitigation strategies made their jobs "easier" and gave them organizational cover to follow their clinical judgment or personal policies. An urgent care clinician noted:

> [the opioid agreement] makes it a little easier because we can tell patients they are only supposed to have one provider who's providing their chronic pain medication, there's certain classes of pain medications that we don't prescribe from the urgent care setting, and then now with the [state PDMP] system in place it's very easy to find out kind of the background of a patient's opiate prescribing or filling medications.

Adopters noted they were comforted with the ability to shift the responsibility for using these strategies to organizational policy or the government. This allowed then to set limits with patients without appearing as non-empathetic clinicians. When patients asked why they used strategies such as the PDMP, one clinician said they replied:

> 'Look, as a policy for our center, this is what we do and that's our philosophy and this is why we do it, and now it's the government's philosophy.' And I think [patients are] more likely to go along with that and not question as much, especially when you say we need to check on your opiate use on [the state PDMP] and, you know, the government is watching things more closely because of this crisis, etc.

1.3 Provided a way to document misuse, abuse, or diversion

Adopters also discussed how the PDMP and results from the urine toxicology screenings helped them present objective evidence of misuse or abuse to patients. When finding evidence of multiple prescribers in the state PDMP, for example, they were able to point directly to the report without having to rely on other clues to discuss possible misuse with the patient. One clinician stated that having the documentation was important for the discussion:

> First of all, you can show them, 'Here. Don't lie to me. This is the list of the doctors, the pharmacy [that gave you that prescription].' So you have a documentation. It's not like arguing with them if they used it. This is what it shows, so don't argue. [It] is a fact. So, yeah, it was very helpful.

Adopters stressed the importance of objectivity and the ability of the risk mitigation strategies to produce evidence that allowed them to make decisions about continuing treatment for patients on opioids. Clinicians in the pain center setting, who were much more likely to be Adopters, discussed experiencing diversion and misuse more frequently. One clinician discussed discharging three patients in their practice within one week because of urine toxicology tests that came back without the presence of an opioid, giving them objective evidence that the patients may have been diverting their opioids. With this evidence, the clinician sent letters to patients informing them that they were being discharged from the clinic and that the clinician would no longer be continuing their opioid medications.

1.4 Routine and systematized protocols made use seamless

Adopters in pain center and urgent care settings described a protocolized system where the risk mitigation strategies were standardized and routinely used. In the pain center setting, opioid agreements, urine toxicology screens, and state PDMP checks were routine practice. Adopters in this setting described the pain agreement as "no big deal" and routine: "We do drug tests, urine tox

screen, random urine tox screen. We do [state PDMP] support which shows you if they get the medication from other provider," explained one anesthesiologist. Administrators supported and encouraged use of the risk mitigation strategies. Nursing staff at the pain center went over the opioid agreements with patients, eliminating the need for clinicians to go over this task.

Urgent care clinicians also described having a structured routine for checking the PDMP. One internist described how they prepared for a patient visit by checking the chief complaint from the medical assistant, and if the chief complaint included a diagnosis such as low back pain, they would look up and print the PDMP report so they could discuss it with the patient.

> I can show them, 'Look, I'm mandated to run this report if I'm going to prescribe these classes of medications, I can see that you've had it filled from this many providers, and this was the most recent time, and this was the number of pills you were given.' If I'm upfront from the beginning with patients, they know that we're going to start out with that baseline of transparency and they're going to be less likely to hide the real story…

The internist preferred being armed with the PDMP report before walking into the room to be able to have a frank conversation with the patient from the start, which prevented an uncomfortable confrontation later in the visit:

> It's been times maybe even before we started rigorously checking [the state PDMP], where a patient would tell you a story and it just seemed a little off and then you would go run the [state PDMP] report and then when you go and you kind of have a confrontational relationship with that patient because you're like, 'you told me one thing, now I see this,' and they may argue what's in the [state PDMP] report, so it's not a good place in the patient-physician relationship at that point. Whereas, if we just set the stage right off the bat, 'Look, I have to run this report when you're prescribed these medications,' and they know that I can see all of that ahead of time, it's a different conversation and often a much easier conversation.

2. Non-adopters and barriers to use of the opioid risk mitigation strategies

2.1 Disruptive to the patient-clinician relationship

Non-adopters of the risk mitigating strategies were uncomfortable using the opioid agreement and urine drug testing. They perceived that these strategies would upset established relationships with patients. Non-adopters perceived that these two strategies treated all patients with distrust or as "drug addicts," as one clinician noted. Conversations about the opioid agreement, particularly with patients who had been receiving opioids for many years, reportedly felt awkward and uncomfortable, and were "a pain the butt." One internist said they were "embarrassed" to give the opioid agreement to patients, feeling uneasy about the "obnoxious" bold print used throughout the agreement. Another internist described an interaction where a patient got "very upset" and was "really offended" when the clinician introduced the pain agreement. The internist described the patient's reaction to the agreement: "you think I'm going to become a drug addict or something, or abuse this." The vivid, unpleasant experience led this internist to refer out patients whom they suspected of misusing opioids.

The nature of urine drug tests, where a clinician is using a tool to check if patients are taking their prescribed opioids or using illicit drugs, also bothered several Non-adopters, as it implied a lack of trust and knowledge in their established patients. Explained one internist:

> I don't need to do a tox screen on my patient that I've known for 15 years who's got a lovely wife and an established business, who's got terrible arthritis in his knee and he can barely walk down the hall, and I see him [in] agony every step he takes.

For non-adopters, the PDMP felt the least adversarial of the strategies. It was the one strategy several Non-adopters reported using regularly. Using the PDMP requires no interaction with the patient unless there are troubling findings. One primary care clinician generally used the PDMP because they felt it gave the clinician concrete, objective evidence, rather than drawing on impressions about a patient:

> Usually I just draw the line at the [PDMP]. These are folks who have had opioid misuse issues… the proof is going to be in their actions, not in their words, not in the way that they dress, not in their other concurrent issues.

2.2 Unnecessary given close relationships

Non-adopters reported that the risk mitigation strategies felt superfluous for three reasons: they knew their patients well, they felt confident in their ability to detect misuse or abuse, and they did not perceive that they had abusive patients in their practice. Non-adopters contended that the long-term relationships they formed with patients gave them enough information to make decisions about their patients' risk for misuse or abuse. They relied on identifying troubling patient behavior, such as repeated calls for early refills or aggressive behavior with medical staff, to detect if the patient was at risk for misuse or abuse. In fact, Non-adopters often described that if they felt the need to use strategies such as urine drug testing or the pain agreement, it was a signal that the patient-clinician relationship was damaged. At this point, they preferred to refer the patient out to another clinician. One internist explained:

> I personally do not have them sign a contract and all the stuff that pain specialists do. That's kind of why I want them on my team, because honestly, I just don't have the time to go through all that, and if I feel that there's somebody breaking that verbal relationship or trust, I'm sending them to pain medicine anyway.

Similarly, rheumatologists who were non-adopters said they did not use the opioid agreement or urine drug testing but referred patients who they deemed at high risk of misuse out to either primary care clinicians or pain specialists. One rheumatologist who practiced in an academic medical setting explained that they viewed the need to use urine drug testing as a reason to refer the patient out because the trusting relationship was broken:

> I do not do urine drug testing. If I reach a point where I need to do urine testing, I'm not believing someone's story, I'm referring them out to a pain clinic.

Non-adopters described workarounds to detect potential diversion or misuse, including examining previous records or questioning dubious requests. They reported feeling confident in their ability to detect misuse or abuse. One internist explained: "I've got a pretty good sniffer as to who's bullshitting me and who's not." Several clinicians described how they listened for suspicious requests from patients, including mentions of allergies to non-opioid analgesics. One internist described:

> They'll tell me that, 'no, I tried that medicine, this medicine had side effects, I was allergic to that, but I kind of like this medicine.' And sometimes they'll fumble with the name a little bit. You know, 'oxy-crodon' or something…. I don't let them know up front that I'm suspicious of them. I always give people the benefit of the doubt, but these are things that I look for.

Additionally, we found a consistent perception among Non-adopters in our sample that they felt it was not *their* patient population abusing these medications, and therefore the risk mitigation strategies were unnecessary. "I don't have those types of patients," explained one internist. One rheumatologist used language that was repeated over and over by several clinicians. Referring to whether they used the PDMP, they said:

> Honestly, I haven't needed to. I really have not been in a position certainly in the past 4 or 5 years where I've felt like somebody's using a lot of drugs and maybe doctor shopping.

This clinician also felt that they didn't need to use the opioid agreement because they didn't have "any patients in my current practice who I've found to be abusive of the privilege."

2.3 Unilateral and unfair to patients

Non-adopters perceived the strategies to be unilateral and unfair to patients. Instead of a written opioid agreement, which felt authoritarian, Non-adopters used workarounds such as verbal

discussions with their patients to outline the risks and potential adverse effects of, and expectations for, taking opioids. A family practice clinician formerly used opioid agreements, but stopped using them because they felt that:

> A lot of folks don't want to sign the agreement because again, it's kind of like admitting, 'Hey, you're the boss. You have all the power. I'm giving everything up.' All the terms in the agreement are for my benefit. There's nothing in there for their benefit, so they really do feel like they're signing everything away.

Requiring urine tests that did not provide additional benefit to the patient also gave non-adopters pause. One clinician felt that they weren't adequately administered with the patient's full consent and were unethical. Another clinician felt that using sophisticated urine drug tests could be too costly for patients. For higher-risk patients, they felt these tests might be appropriate, but they wouldn't use these tests on all of the patients because the financial costs to patients outweighed the benefits.

Non-adopters expressed concern that patients were already stigmatized for taking opioids and didn't want to introduce risk strategies that further stigmatized these patients. One internist expressed a concern about not pre-judging patients when discussing the use of the PDMP:

> Frankly, I mean I'm so old school I try not to look at old records with a new patient. I want to go in fresh and form my own opinions and then obviously I don't disregard old stuff.

1.4 Require broaching taboo topics

Checklists such as the Opioid Risk Tool often require asking sensitive questions about personal and family history of substance use and history of preadolescent sexual abuse, topics which Non-adopters found difficult to broach. One internist described that they felt the Opioid Risk Tool posed questions about topics that they felt they would be uncomfortable answering:

> But you know if I were going for hip surgery and somebody gave me one of these or said you have a personal history of substance and so forth… I'm not sure I would really like that… it is tough to ask these questions.

Very few Non-adopters reported using strategies such as the Opioid Risk Tool. Others developed workarounds, using the tools as rough mental checklists instead of actually filling them out. One clinician explained their modified process to identify risk for misuse or abuse:

> So if it's acute pain, I don't necessarily do the whole Opioid Risk Tool, but I'll at least be like… alcohol, drug history, and I'll check the [PDMP].

1.5 Difficult to implement given the lack of time, protocols, and incentives

A few Non-adopters viewed the risk mitigation strategies positively. Among these Non-adopters, the main barriers to implementation were lack of time, protocols, and resources to implement the strategies. In particular, the lack of a structured process that integrated the four risk mitigation strategies into the clinical workflow posed a major barrier. Several clinicians contrasted this lack of an integrated workflow to the clear protocols that had been developed for treating patients with diabetes or hypertension. The current system required individual providers to remember all of the individual components, "and painstakingly go and collect all that information and synthesize it," explained one internist. Protocols also appealed to clinicians because they allowed them to depersonalize the decision to use it. One internist described that they would prefer "making [the pain agreement] standard, so that we don't feel bad asking a patient to sign an agreement. We can say 'Listen, this is policy and this is what we need to do.'"

In the primary care setting, limited time was also a significant barrier. Clinicians mentioned how integrating a discussion involving the opioid agreement – a multiple-page document – into a rushed primary care visit was difficult. Going over the agreement often took as long as 40 minutes, far longer than the time allotted for most primary care visits. One internist said they would use the opioid agreement more often if there was a clear workflow where clinical staff could begin the conversation, reducing the time burden on the physician:

> I think [the opioid agreement is] a very useful tool. For me, personally, it's somewhat time consuming if you don't have it part of the workflow… So, something that your

> staff can pull up and then start the conversation and then you can complete it. Those tend to be the most successful forms-oriented encounters.

The lack of incentives to add these additional processes also played an important role for some Non-adopters. One internist regularly checked to see how they were doing on things like blood pressure checks and diabetes goals, but "at the end of the year when you receive your pay plan and someone looks at how well you're doing, there is no similar quantification of care for pain." They cited the lack of incentives from the federal government or insurers for this lack of a protocol:

> There is no systematic marker for pain management. Which is, in my opinion, the real reason why we don't have a solution. Because if someone said, 'You're going to get paid based on how well you do this,' you can be sure the ducks are going to get lined up pretty quickly. Because it will be part of your pay-for-performance dashboard.

Finally, inertia played a role for some clinicians. Several primary care clinicians who had been in practice for many years reported that they had not integrated checking patients' prescriptions using the PDMP. They initially attempted to use the state database several years ago, but found it difficult to use and had not logged back in. They resorted to their own workarounds to detect aberrant behavior such as checking the chart or relying on cues about the person's demeanor.

DISCUSSION

In this qualitative study using a sample of clinicians practicing in outpatient settings, we found that adopters felt protected by these strategies, as they allowed them to point to objective evidence when setting boundaries with or pushing back against patients. These perceptions were voiced by clinicians in the urgent care and pain management settings, where care is more episodic and there are fewer concerns about damaging existing therapeutic relationships. Adopters also pointed to set protocols and resources available to implement the strategies. Non-adopters of the strategies described several barriers to use, including concerns about the disruption of the patient-clinician relationship, lack of usefulness of the strategies, lack of benefits for patients, a desire to

avoid taboo topics such as history of substance use and sexual abuse, and lack of protocols, time, and incentives. These concerns were primarily voiced by clinicians in primary care and non-pain specialty settings, where long-term relationships are prioritized.

Our findings have important implications for clinicians, health systems administrators, and policymakers. In our study, Non-adopters voiced concerns about how the opioid agreements could introduce a significant power differential between patients and clinicians. Others have found similar perceptions about the strategies' potential to disrupt patient-clinician relationships (19). Our findings lend support to concerns raised by critics of risk assessment strategies, who note that their use may impede or harm the important therapeutic relationship between patients and providers and conflict with clinicians' ethical principles (24-27). Buchman and Ho argue that strategies such as the urine drug test and the opioid agreement assume the patient is untrustworthy, which can undermine the credibility of the patient's story: "If patients distrust their physician, or feel distrusted by them, this may destabilise the therapeutic relationship and compromise care" (24).

Administrators, policymakers, and researchers focused on improving adoption of these risk mitigation strategies should examine ways in which the strategies can be co-designed with clinicians and patients to minimize disruption to the patient-clinician relationship. For example, there have been several efforts to make some of these risk mitigation strategies more patient-centric and easier to implement, which could increase their uptake (28-30). Several have argued that opioid agreements and urine drug testing should be eliminated altogether in favor of shared decision-making aids. Tobin et al. (2016) describe the development of an opioid agreement that would be used in the context of shared decision-making (30). The proposed checklist contains physician and patient responsibilities in easy-to-understand language without legal jargon. Health system administrators and clinicians may consider switching from opioid agreements that contain terms primarily for the provider to shared decision-making tools that build on the patient-clinician therapeutic relationship.

Non-adopters in our study revealed their values as they spoke about reasons for not using the strategies. They cited concerns about fairness and not wanting to further stigmatize patients. Implementation is most effective when there is a good fit between the values underlying an innovation and the values of those implementing the innovation are aligned. In 1996, Klein and Sorra introduced a model to explain key determinants of implementation effectiveness (31). Within this model, one important determinant is whether there is a perceived fit between the innovation and the values of the employees (31). When the innovation-values fit is poor, there may be resistance or lackluster compliance even where the organization is committed to implementation. In our study, when clinicians found that certain opioid risk mitigation strategies conflicted with the patient-clinician relationship or were unfair to patients, they found workarounds or complied only partially. For example, clinicians opted for verbal agreements instead of written agreements or avoided most strategies. Without meaningful buy-in, these risk mitigation strategies could become perfunctory checklists instead of thoughtful conversations about the risks of opioid medications, concerns that others have raised as well (32). Ensuring that the strategies are designed and aligned with clinicians' values is critical to adoption.

Another important determinant of implementation success described by Klein and Sorra is the organization's climate for implementation (31). Klein and Sorra posited that organizations can create a climate where employees are encouraged, cultivated, and rewarded for the use of a given innovation. We found that clinicians in the urgent care and pain clinic settings who were most comfortable with using these strategies cited a strong and effective climate for implementation at the clinic level. Clinicians working in the pain clinic setting referred to management that was supportive of the use of the strategies, protocolized processes for use of the strategies, and allocated resources for the implementation of the opioid agreement and urine drug testing. In contrast, the few primary care clinicians who embraced the strategies felt that the lack of protocols and resources allocated to

implementing these strategies hindered their adoption, findings that others have identified as well (33-35). To reduce barriers to implementation, organizations should consider ways in which non-physician staff could implement some of these strategies to reduce the administrative burden on primary care clinicians. On a policy level, many states currently only allow physicians to access the PDMP; policymakers should consider legislation that allows medical staff such as medical assistants to check these state databases to increase use without overburdening providers.

Our study has some limitations. We interviewed clinicians who mostly see insured patients in one metropolitan area, which may limit the applicability of our findings to similar practice settings. We also examined only perceived use of the risk mitigation strategies and were not able to examine documented adoption; future studies using mixed methods could examine both documented use and clinicians' and patients' perceptions. Our study also has several strengths. The majority of studies have focused on studying these strategies in isolation, whereas we examined their use collectively, which provided insights into similar barriers to use for different strategies. Additionally, most studies focused on the use of these strategies in the primary care or emergency department settings; our study is one of the few that examined the use of the strategies among rheumatologists, neurologists, and clinicians in pain management settings.

In conclusion, we found that in settings where patient-clinician relationships are important, risk mitigation strategies perceived by clinicians to harm the patient-clinician relationship or to have little benefit to the patient were less likely to be implemented. In settings where care is more episodic and the patient-clinician relationship is less important, the strategies felt useful and protective. Given the risks of opioid medications and their potential for abuse, clinicians need effective tools to communicate the risks and benefits of opioids to patients and assess risk of opioid misuse. However, it is critical that these different types of relationships be acknowledged when designing and implementing these risk mitigation strategies.

Table 1. Description, Implementation, and Evidence of Risk Mitigation Strategies			
Risk Mitigation Strategy	**Description**	**Evidence Base**	**Use**
Opioid Agreement	Agreements or contracts that outline expectations of how opioids will be prescribed and monitored.	Weak, limited evidence that opioid agreements reduces misuse (10).	Widely used (36). Included in the 2016 CDC guidelines (2).
Prescription Database Management Programs (PDMPs)	State monitoring programs that track controlled medications dispensed from pharmacies.	Mixed evidence on their effectiveness, likely resulting from heterogenous state programs and implementation (37). Evidence of reduction of multiple prescribers per patient, decrease in monthly quantity of opioids dispensed, and total opioids dispensed (12, 37).	49 states have implemented PDMPs, at least 34 states are now requiring prescribers and/or dispensers to check the databases before prescribing (38). Included in the 2016 CDC guidelines (2).
Urine Drug Testing	Clinicians use urine drug testing to look for the presence of the prescribed controlled medication as evidence of use. Urine drug testing can also be used the presence of illicit or non-prescribed controlled medications.	Weak, limited evidence that urine drug testing reduces misuse, overdose, or diversion (8, 10).	Widely used, recommended by professional medical societies and the CDC (6, 13).
Risk Screening Tools: Screener and Opioid Assessment for Patients with Pain-Revised (SOAPP-R), the Brief Risk Interview, Opioid Risk Tool, Current Opioid Misuse Measure (COMM)	Clinician-directed or patient self-assessments to screen for risk factors or aberrant behaviors associated with opioid misuse.	No evidence that these tools reduce addiction, abuse, misuse, or overdose (2, 6, 39). Limited, inconsistent evidence that the tools predict opioid abuse and misuse (39).	Some tools (COMM) recommended by professional medical societies (6).

Table 2. Study Participant Characteristics: Clinicians Who Prescribe Opioids in the Outpatient Setting (N = 32)	
Mean Years in Practice, mean (range)	19.1 (2-40)
Sex, no. (%)	
Male	18 (56%)
Female	14 (44%)
Clinician Specialty, no. (%)	
Primary Care	
(e.g. Internal Medicine, Family Medicine)	20 (62%)
Pain Specialist	
(e.g. Anesthesiology, DDS with Residency in Pain Medicine)	6 (19%)
Non-Pain Specialist	
(e.g. Neurology, Rheumatology)	6 (19%)
Practice Type*	
Health Maintenance Organization Group	17 (53%)
Private Practice	8 (25%)
Faculty	3 (9%)
Pain Clinic	5 (16%)

*Totals may exceed 100% due to individuals in multiple categories

Table 3. Reasons for non-use and use of risk assessment strategies from clinicians identified as Adopters and Non-adopters	
Adopters reasons for using the risk mitigation strategies	**Non-adopters reasons for not using the risk mitigation strategies**
• Treated patients equally • Facilitated with setting boundaries • Provided a way to document misuse, abuse, or diversion • Routine and systematized protocols made use seamless	• Disruptive to the patient-clinician relationship • Unnecessary given close relationships • Unilateral and unfair to patients • Require broaching taboo topics • Difficult to implement given the lack of time, protocols, and incentives

CHAPTER 2: Appendix 1: Sample questions from Semi-Structured Interview Guide

1. What does the typical assessment look like for someone's first time pain-related visit?
    a. PROBE Can you guide me through what happened at a recent office visit for a patient who came in for pain?
2. What are the main factors that influence your decision to prescribe opioid medications?
3. Upon prescribing an opioid pain medication for the first time to a patient, what kind of discussion do you have with them?
    a. PROBE Could you give me an example of a recent conversation that you had with a patient?
4. What do you think about the PDMP? Is it useful? When is it most useful? When is it least useful or you find that you don't need to use it?
    a. PROBE: Can you tell me about your encounters last week? Did you check the PDMP?
5. What are your thoughts on opioid or pain contracts? Do you find them useful or not useful?
    a. PROBE: Can you tell me about the last time you used a pain contract? What was that conversation like?
6. What are your thoughts on urine drug testing? When do you use urine drug testing?
    a. PROBE: Can you tell me about the last time you used this test?
7. Have you used tools to assess patients for risk such as the Opioid Risk Tool? When was the last time you used the tool?
8. Do you discuss substance use with your patients?
    a. How does that information affect your decision-making?
9. What do you think about the media coverage of opioids? Has this changed your practice in any way?
10. What are your thoughts of how health systems are handling opioid prescribing?
11. Have there been changes to how you think about prescribing opioid medications over the last few years?

References

1. Substance Abuse and Mental Health Services Administration. SAMHSA opioid overdose prevention toolkit. SAMHSA Opioid Overdose Prevention Toolkit: HHS Publication Rockville, MD; 2013.

2. Centers for Disease Control and Prevention. CDC Guidelines for Prescribing Opioids for Chronic Pain: Guidelines at a Glance. In: Prevention CDC, editor. 2016.

3. Jones CM. Heroin use and heroin use risk behaviors among nonmedical users of prescription opioid pain relievers – United States, 2002–2004 and 2008–2010. Drug and Alcohol Dependence. 2013;132(1):95-100.

4. Rudd R, Aleshire N, Zibbell J, Gladden R. Increases in drug and opioid overdose deaths—United States 2000–2014. Morbidity and Mortality Weekly Report. 2016;64:1374-82.

5. Seth P, Rudd RA, Noonan RK, Haegerich TM. Quantifying the Epidemic of Prescription Opioid Overdose Deaths. American Journal of Public Health. 2018;108(4):500-2.

6. Chou R. 2009 clinical guidelines from the American Pain Society and the American Academy of Pain Medicine on the use of chronic opioid therapy in chronic noncancer pain: what are the key messages for clinical practice? Pol Arch Med Wewn. 2009;119.

7. Ali MM, Dowd WN, Classen T, Mutter R, Novak SP. Prescription drug monitoring programs, nonmedical use of prescription drugs, and heroin use: Evidence from the National Survey of Drug Use and Health. Addictive Behaviors. 2017;69:65-77.

8. Argoff CE, Alford DP, Fudin J, Adler JA, Bair MJ, Dart RC, et al. Rational Urine Drug Monitoring in Patients Receiving Opioids for Chronic Pain: Consensus Recommendations. Pain Medicine. 2018;19(1):97-117.

9. Webster LR, Webster RM. Predicting aberrant behaviors in opioid-treated patients: preliminary validation of the opioid risk tool. Pain medicine (Malden, Mass). 2005;6.

10. Starrels JL, Becker WC, Alford DP, Kapoor A, Williams AR, Turner BJ. Systematic Review: Treatment Agreements and Urine Drug Testing to Reduce Opioid Misuse in Patients With Chronic Pain. Annals of Internal Medicine. 2010;152(11):712-20.

11. National Conference of State Legislatures. Prescribing policies: States confront opioid overdose epidemic Washington, D.C.2018 [updated April 4, 2018.

12. Winstanley EL, Zhang Y, Mashni R, Schnee S, Penm J, Boone J, et al. Mandatory review of a prescription drug monitoring program and impact on opioid and benzodiazepine dispensing. Drug and Alcohol Dependence. 2018;188:169-74.

13. McBane S, Weigle N. Is it time to drug test your chronic pain patient? The Journal of family practice. 2010;59(11):628-33.

14. Centers for Disease Control and Prevention. Quality Improvement and Care Coordination: Implementing the CDC Guideline for Prescribing Opioids for Chronic Pain. Atlanta, GA: National Center for Injury Prevention and Control, Division of Unintentional Injury Prevention; 2018.

15. Kilaru AS, Gadsden SM, Perrone J, Paciotti B, Barg FK, Meisel ZF. How Do Physicians Adopt and Apply Opioid Prescription Guidelines in the Emergency Department? A Qualitative Study. Annals of Emergency Medicine. 2014;64(5):482-9.e1.

16. Hariharan J, Lamb GC, Neuner JM. Long-Term Opioid Contract Use for Chronic Pain Management in Primary Care Practice. A Five Year Experience. Journal of General Internal Medicine. 2007;22(4):485-90.

17. Hildebran C, Cohen D, Irvine J, Foley C, O'Kane N, Beran T, et al. How clinicians use prescription drug monitoring programs: a qualitative inquiry. Pain medicine (Malden, Mass). 2104;15(7):1526-4637.

18. Leichtling GJ, Irvine JM, Hildebran C, Cohen DJ, Hallvik SE, Deyo RA. Clinicians' Use of Prescription Drug Monitoring Programs in Clinical Practice and Decision-Making. Pain medicine (Malden, Mass). 2017;18(6):1063-9.

19. Starrels JL, Wu B, Peyser D, Fox AD, Batchelder A, Barg FK, et al. It made my life a little easier: primary care providers' beliefs and attitudes about using opioid treatment agreements. J Opioid Manag. 2014;10(2):95-102.

20. Charmaz K. Constructing grounded theory: A practical guide through qualitative analysis. Second edition. Thousand Oaks, CA: Sage; 2014 2014.

21. Blumer H. What is Wrong with Social Theory? American Sociological Review. 1954;19(1):3-10.

22. Saldana J. The Coding Manual for Qualitative Researchers. London, UK: Sage Publications, Inc.; 2009.

23. Corbin J, Strauss AC. Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory. Thousand Oaks, CA: Sage Publications, Inc.; 2008 2008//.

24. Buchman DZ, Ho A. What's trust got to do with it? Revisiting opioid contracts. Journal of Medical Ethics. 2013.

25. Kaye AD, Marshall ZJ, Lambert SM, Trescot AM, Prabhakar A, Elhassan AO, et al. Ethical perspectives on urine drug screening for pain physicians. Pain Physician. 2014;17(5):E559-64.

26. Chapman L, dela Cruz AM, Hutto J. Opioid Treatment Agreements: Helpful or Hurtful? American Journal of Psychiatry Residents' Journal. 2016;11(9):14-6.

27. Collen M. Opioid Contracts and Random Drug Testing for People with Chronic Pain — Think Twice. The Journal of Law, Medicine & Ethics. 2009;37(4):841-5.

28. Ghods MP, Schmid IT, Pamer CA, Lappin BM, Slavin DC. Developing and Initiating Validation of a Model Opioid Patient-Prescriber Agreement as a Tool for Patient-Centered Pain Treatment.

29. Wallace LS, Keenum AJ, Roskos SE, McDaniel KS. Development and Validation of a Low-Literacy Opioid Contract. The Journal of Pain. 2007;8(10):759-66.

30. Tobin DG, Keough Forte K, Johnson McGee S. Breaking the pain contract: A better controlled-substance agreement for patients on chronic opioid therapy. Cleveland Clinic journal of medicine. 2016;83(11):827-35.

31. Klein KJ, Sorra JS. The Challenge of Innovation Implementation. The Academy of Management Review. 1996;21.

32. Payne R, Twillman R. Policy Brief: Opioid Treatments or "Contracf": Proceed with Caution. Kansas, MO: Center for Practical Bioethics; 2014 2014.

33. Chaudhary S, Compton P. Use of risk mitigation practices by family nurse practitioners prescribing opioids for the management of chronic nonmalignant pain. Substance abuse. 2017;38(1):95-104.

34. Starrels JL, Becker WC, Weiner MG, Li X, Heo M, Turner BJ. Low Use of Opioid Risk Reduction Strategies in Primary Care Even for High Risk Patients with Chronic Pain. Journal of General Internal Medicine. 2011;26(9):958-64.

35. Albrecht JS, Khokhar B, Pradel F, Campbell M, Palmer J, Harris I, et al. Perceptions of patient provider agreements. Journal of Pharmaceutical Health Services Research. 2015;6(3):139-44.

36. Fishman SM, Bandman TB, Edwards A, Borsook D. The Opioid Contract in the Management of Chronic Pain. Journal of Pain and Symptom Management. 1999;18(1):27-37.

37. Finley EP, Garcia A, Rosen K, McGeary D, Pugh MJ, Potter JS. Evaluating the impact of prescription drug monitoring program implementation: a scoping review. BMC Health Serv Res. 2017;17(1):420.

38. National Alliance for Model State Drug Laws. Mandated Use of State Prescription Drug Monitoring Programs. National Alliance for Model State Drug Laws; 2016 November 8, 2016.

39. Chou R, Deyo R, Devine B, Hansen R, Sullivan S, Jarvik JG, et al. The Effectiveness and Risks of Long-Term Opioid Treatment of Chronic Pain. Rockville, MD: Agency for Healthcare Research and Quality; 2014.

CHAPTER 3: Study 2 : Understanding Clinicians' Decisions to Assume Prescriptions for New Patients on Long-Term Opioid Therapy

ABSTRACT

Background

Given the changing political and social climate around opioid medications, we examined how clinicians in the outpatient setting made decisions about assuming the management of opioid prescribing for patients new to their practice who were already on long-term opioid therapy for chronic pain.

Methods

The study design, interview guides, and coding were guided by constructivist grounded theory methodology. We conducted in-depth interviews with 32 clinicians in the Los Angeles area who prescribed opioid medications in the outpatient setting for chronic pain as part of a larger study into decision-making about prescribing opioids.

Results

Our sample included 21 primary care clinicians, including 17 internal medicine physicians, three family medicine physicians, and one primary care nurse practitioner; 6 clinicians with specialized training in medicine, including three outpatient anesthesiologists, two dentists with training in pain medicine, and one physical medicine and rehabilitation physician; and 6 other specialists, including four rheumatologists and two neurologists. We identified three approaches to assuming a new patient's opioid prescriptions. The *Staunch Opposers* expressed the most anti-opioid views and were highly averse to continuing opioid prescriptions for new patients. These clinicians, mostly clinicians with specialized training in pain medicine, declined to see patients already on opioid therapy or refused to assume the opioid prescriptions in the first visit. Our second group, the *Cautious and Conflicted Prescribers,* were generally uneasy about prescribing opioid medications for chronic pain, but

were willing to refill new patients' existing opioid prescriptions if the patient was perceived as trustworthy and if the dose and medication type fell within their pre-set comfort zone. This group was composed of clinicians in a variety of specialties. Our third group, the *Rapport Builders,* mostly primary care physicians, were the most willing to assume a new patient's opioid prescription, even if the prescription was for a high dose. These clinicians were often strategic in their approach to transitioning patients to safer doses, working to form a strong clinician-patient bond before introducing the idea of reducing the dose or tapering down medications. Clinicians in the first two groups described feeling resentful about other clinicians "dumping" patients on chronic opioid therapy on them, while clinicians in the third group often viewed managing new patients on opioid therapy as an opportunity to transition patients to safer doses.

Discussion

In this single institution study, we found that clinicians with the most training in pain management were the least willing to assume responsibility for patients already on long-term opioid therapy. In contrast, a subgroup of primary care clinicians, who traditionally have had the least pain management training, were the most willing to assume this responsibility. This creates a challenge because primary care clinicians face several existing barriers to providing high-quality care for patients with complex pain conditions such as short visit times and less specialized training. If clinicians with pain specialty training are unwilling to manage patients on long-term opioid therapy, primary care clinicians' ability to refer complex cases may limited and they may need more training to support their roles.

INTRODUCTION

In the last several decades, perceptions of opioid medications for the treatment of chronic pain have changed dramatically, with a corresponding swing in prescribing behavior. The medical and cultural zeitgeist has swung from perceiving opioids as highly addictive and prone to misuse, to seeing opioids as helpful for chronic pain, and back to perceiving these medications as addictive and dangerous. Caught in the middle of these swings have been individuals with chronic pain, many of whom were prescribed opioids in an era when opioids were perceived as appropriate for long-term use and freely prescribed. While many individuals remain on prescription opioids, clinicians are now more reluctant to prescribe these medications. Such individuals, who may be physiologically and psychologically dependent on opioid medications and may be seeking prescribers, have been referred to in the medical literature as "inherited patients" (1).

Despite volumes of literature on the opioid epidemic, little has been written about how clinicians decide whether to take on the opioid prescriptions of "inherited patients." This decision-making process has important societal implications; if individuals cannot find a clinician to continue their opioid medications, they may experience severe withdrawal symptoms and turn to illegal drugs to avoid withdrawal (1). Understanding this decision-making process can provide insight into potentially negative perceptions that clinicians may have about patients taking opioids for chronic pain.

This paper describes how clinicians make decisions about assuming opioid prescriptions for patients new to their practice and already on long-term opioid therapy. First, we review the literature on the evolution of perceptions of opioid medications and the implications of these shifts in perception. Subsequently, we outline our study methods, an analysis of qualitative interviews conducted with a sample of clinicians in Los Angeles, California. In our results, we describe a continuum of how clinicians approach assuming opioid prescriptions for new patients on existing

opioid therapy. We categorized clinicians into three groups depending on their approach to managing these patients and discuss the implications of their decision-making approach.

BACKGROUND

The changing landscape of opioid prescribing

The rise of the opioid epidemic has resulted in a marked shift in recommendations about prescribing opioids. Prior to the 2000s, opioids were reserved for post-operative pain, palliative care, and cancer-related pain (2). A confluence of factors, including changing views about how to treat chronic pain (3), the release of strong opioid medications such as OxyContin, and the heavy marketing of opioids to clinicians (4) resulted in a marked increase in opioid prescriptions (3). In 2012, at the peak of opioid prescribing, providers wrote 82.5 opioid prescriptions per 100 persons in the United States (5). Clinicians prescribed opioids for more individuals, for longer lengths of time, and often at higher doses, resulting in more individuals at risk of addiction, drug overdose, and death (6). Individuals in the United States were prescribed twice as many opioids per capita than the second-ranked nation (7). The last decade has seen a spike in opioid-related deaths, emergency department visits, and hospitalizations, many tied to prescription opioids (6, 8, 9). This rise in overdoses and deaths led the Centers for Disease Control and Prevention (CDC) to release guidelines regarding opioid prescribing in 2016 (10). These guidelines, along with guidelines from other medical societies (11-13), now recommend that clinicians optimize non-opioid therapies and use the lowest dosages possible to achieve realistic functional goals. In addition to new guidelines, dozens of state laws now focus on regulating opioid prescribing, limiting initial doses and the number of days prescribed (14).

The challenges of managing "inherited patients"

This regulatory climate, coupled with increased media coverage of the opioid epidemic (15), has placed great scrutiny on prescribing behaviors, increasing clinicians' discomfort with prescribing opioid medications (15). Providers report feeling fears of prosecution or regulatory scrutiny for inappropriate prescribing of opioids (1, 16, 17). There have been several reports that clinicians have

abruptly stopped prescribing opioids for many patients, resulting in patients with chronic pain feeling abandoned and without treatment (18-20). Clinicians may fear taking on patients on long-term opioid therapy and feeling trapped in a situation for which they do not agree with the regimen. In an article about recommendations on how to manage "inherited patients" on long-term opioid therapy, Gourlay and Heit note:

> …a very real barrier to undertaking the care of a new patient who is on a complex regimen of medications, especially opioids, is the fear that once they accept the patient into their practice, [clinicians] will have no choice but to continue on with this course of therapy, even if all reasonable assessments would suggest that it is not optimal (1).

Gourlay and Heit recommend that clinicians start with an initial visit of "mutual fact finding," in which the patient and clinician assess whether the relationship will be a good fit. Although the authors suggest a "mutual" process, most of their article concerns actions that the clinician should take, including assessing whether the opioid therapy is appropriate, whether the patient has psychiatric comorbidities, or whether the patient has a personal or family history of substance-use disorder or an active substance-use disorder (1).

Despite these recommendations, it is not well understood how clinicians approach managing "inherited patients" in practice. The literature on managing "inherited patients" is scant. Owston also recommends an initial assessment with a thorough history, review of previous records, and assessment of risks for overdose, diversion, or abuse (21). Understanding this process can provide insight into what Gourlay and Heit refer to as not only a problem for patients, but also:

> a societal problem…When legitimate pain patients are deprived of the opioid medication they have been taking, this can lead to an immediate crisis situation… Patients traveling long distances to obtain medication, frequenting multiple

> emergency departments or walk-in clinics, or engaging in frank criminal behavior may be a direct result of these patients trying to solve this problem (1).

Others have also written about how clinicians' aversion to prescribing opioids has led to patients on chronic opioid therapy feeling highly stigmatized and having to travel long distances to obtain their prescriptions (22).

Although these studies highlight the potential consequences of clinicians' reluctance to prescribe opioids, we wanted to identify the reasoning behind this reluctance and how clinicians acted on this reasoning. Thus, in this study, we sought to understand how clinicians in outpatient settings made decisions about assuming opioid prescriptions for new patients on long-term opioid therapy by using our sample of clinicians practicing in the Los Angeles area. We examined how clinicians in different settings interacted with individuals in chronic pain who are on long-term opioid therapy, and so included clinicians in primary and specialty care (neurology, pain management, rheumatology) settings to observe the interactions with "inherited patients" between these groups of clinicians. We examined the types of strategies they used in assessing whether to assume new patients' opioid prescriptions.

METHODS

This study is part of a larger study aimed at understanding how clinicians prescribe opioid medications in the outpatient setting. In other papers, we examine how clinicians perceive and treat the side effects of opioid medications, and how they use various risk assessment strategies aimed at reducing opioid misuse, abuse, or diversion.

Sample

For the larger study, we interviewed 33 clinicians who prescribed opioid medications and were affiliated with an academic medical system in the Los Angeles area; of them, 32 clinicians reported they worked in an outpatient setting. We used purposive sampling techniques to identify

potential study participants in any one of the following specialties: internal medicine, family medicine, neurology, rheumatology, physical medicine and rehabilitation, and pain medicine (outpatient anesthesiology and dentistry with a specialization in pain medicine). We excluded clinicians in the emergency department and surgical specialties given that opioid prescribing in these settings is very different and subject to other guidelines. We emailed potentially eligible clinicians within the medical system. Clinicians were offered $250 to participate. The study was reviewed and approved by the Institutional Review Board at the study site.

Setting

Clinicians in our sample had inpatient privileges at one tertiary care academic medical center and worked in various outpatient settings in the Los Angeles area including private concierge-style practices or those that accepted only limited insurance plans, such as Medicare and preferred provider organization (PPO) plans; Health Maintenance Organization (HMO) groups; urgent care clinics; a specialized pain center; and an academic medical center. Some clinicians worked in more than one of these practice settings. We sought to interview clinicians with different levels of experience, practice settings, payment models, and specialties to capture a wide range of experiences.

Interviews

We conducted the interviews from July 2016 to February 2018. We conducted the interviews at clinicians' offices or in a private room at the researchers' offices. The interviews were 60–120 minutes in length. One clinician was interviewed twice in order to gather more detailed data. A professional transcription service transcribed all interviews, and the transcriptions were checked for accuracy. All identifying information was changed to protect confidentiality.

Coding and Analysis

We used constructivist grounded theory to guide the coding and analysis for this study (23-25). We coded the first 10 interviews using line-by-line coding (i.e., "initial coding") to identify

preliminary reoccurring and significant codes (i.e., "focused codes"). Coding is viewed as a way to sort, summarize, and analyze each piece of data (23). From this preliminary coding, we wrote memos that identified potential focused codes, which are more conceptual codes that identified significant ideas within the data. For example, a focused code captured how various clinicians used screening strategies to avoid seeing new patients who were looking for a clinician to take over their prescriptions. We coded the rest of the transcripts using focused codes, adding to the codebook as we developed new focused codes. Throughout the process, we wrote memos using the constant comparison method that is core to constructivist grounded theory, identifying areas where there were similarities, variations, or differences in the data (23, 26, 27). For example, for this study, we wrote a memo to identify, describe, and compare variation in how clinicians assessed whether a patient was trustworthy.

RESULTS

Study Participants

For this study, we included data from 32 clinicians, which included 17 internal medicine physicians, three family medicine physicians, one primary care nurse practitioner, four rheumatologists, two neurologists, three anesthesiologists, two dentists with additional training in pain medicine, and one physical medicine and rehabilitation physician (see Table 1). Four primary care clinicians practiced in both the urgent and primary care settings. Participants worked in different roles: some worked in urgent care practices, the majority worked in outpatient settings, and some worked in both urgent and primary care. We interviewed clinicians across Los Angeles County; their catchment areas were predominantly middle- and upper-class neighborhoods. Clinicians ranged in level of experience, from only 2–3 years out of residency to having more than 40 years of practice experience. We have obscured the gender of the study participants to protect confidentiality.

Willingness to manage patients on chronic opioid therapy: A continuum

We identified a continuum of willingness to take on patients on chronic opioid therapy, from clinicians who were strongly opposed to it to those who were more accepting. From this continuum, we constructed three categories of clinicians that described this willingness to assume prescriptions for new patients already on opioid therapy. One group, the *Staunch Opposers*, was highly averse to taking on new patients already on chronic opioid therapy. These clinicians, mostly pain medicine specialists, used a variety of strategies to screen out patients who they suspected were looking for a new prescriber. The *Cautious and Conflicted Prescribers* were generally uneasy about prescribing opioid medications for chronic pain but willing to manage new patients if they were trustworthy or if the dose and medication type fell within their pre-set "comfort zone." The *Rapport Builders*, mostly primary care physicians, were the most willing to assume a new patient's opioid prescription, even if the prescription was for a high dose. These clinicians were strategic in their approach to transitioning patients to safer doses, working to form a strong clinician-patient bond before introducing the idea of reducing the dose or tapering down medications. We describe these three groups in detail below.

Staunch Opposers

Clinicians identified as Staunch Opposers expressed a high aversion to managing new patients already on chronic opioid therapy. These clinicians sought to distance themselves from patients on chronic opioid therapy by prescreening patients or making their opposition to opioids apparent in the first visit. For example, one rheumatologist who noted they didn't "like to provide narcotics" explained how they approached new patients: "I give [patients] a disclaimer right up front that I'm not the right doctor to come to if you just want a prescription for your pain pill." Several clinicians working in a pain center setting, including anesthesiologists and dentists with specialized training in pain medicine, described using a structured screening process involving medical assistants

or front desk staff to assess whether patients were looking for a new provider who would refill their opioid prescriptions. Most of these clinicians had implemented strict no-opioid or low-opioid policies and instructed their staff to ask questions about a patient's reasons for the visit. Clinicians described how their medical staff would communicate their no-opioid policies to patients, either specifically noting the policies or noting that the first visit was a consultation and that patients should not expect a refill for their medication. One clinician summarized their approach:

> I mean, if the patient calls [for] an initial consult, at least I know my assistant then will tell the patient that this is not how I practice, and I don't prescribe narcotics, so if they're coming for that purpose, then they'll just be let down from the get-go.

The prescreening strategy allowed clinicians to assert their autonomy not to prescribe before the patient ever walked in the door, which they noted was preferable to having to say "no" in person. Clinicians described pushing back against a patient's demand for a refill, particularly when the request was for a regimen with which they would not agree. One anesthesiologist explained:

> [Patients will] come with high-dose narcotics, and they expect, 'Oh, you're just gonna refill my narcotic.' No, I'm not. Whatever they've been doing maybe wasn't right, and I'm not agreeing with that plan. So, yeah. I don't have to.

Anesthesiologists and other pain specialists in the Staunch Opposer group also described perceiving having patients "dumped" on them by other clinicians, including surgeons and primary care clinicians who no longer wanted to prescribe opioids, an action they resented. One pain specialist explained: "Some internists, they just wanna dump the patient. They don't wanna deal with them… If it's a dump, they just want us to take over, and [if] we don't, they get upset." This clinician and others said that they often did not agree with the current dose and frequency and that it was very challenging to taper patients down if the patients did not want to do so. By setting no-

opioid policies, they were able to assert their clinical autonomy not only with patients, but also with other clinicians.

Several study participants said they perceived managing patients on chronic opioid therapy as time-consuming, difficult, and not within their clinical interests. They therefore preferred to refer those patients to other physicians. One primary care doctor explained they found patients on chronic opioid therapy "a pain — excuse the pun — to manage." The clinician described inheriting several patients already on chronic opioid therapy who typically had severe pain conditions and the various reasons they preferred not to manage their prescriptions and conditions:

> Those are very difficult, and those are the ones [that] generally I'll refer to pain management. But because I think to properly manage these patients, it takes more than the usual 15-minute office visit…. [It takes] a dedicated approach that focuses on pain management, and it's a very difficult group of patients, and, frankly, it's not one of my interests.

A neurologist echoed this sentiment, saying that while they previously had managed a few patients on chronic opioid therapy, they had switched their practice to doing more specialized consultative care. The clinician said they didn't decline new patients on chronic opioid therapy "because of all the craziness that's going on about the opioid epidemic" but rather because "it's not what I want my role to be."

This clinician's views on the opioid epidemic and of patients on long-term opioid therapy were the exception among physicians in this group. Most clinicians in the Staunch Opposers group generally viewed opioids and patients on long-term opioid therapy in a negative light. The majority of this group perceived opioid medications as largely ineffective for chronic pain, noting that the medications not only failed to address the pain but also often caused other problems, such as side effects or increased pain. One clinician emphasized that they would "never give narcotics to

somebody with chronic migraines… if you look at chronic migraines, it's the biggest no-no, since that's going to cause more relapse." Other clinicians pointed to the adverse effects of opioid medications as reasons for their aversion to prescribing. One primary care clinician explained: "I'm concerned about the adverse effects and also in the older people, all you've got to do is give them severe constipation, and you can have a problem that's as bad as what you used the narcotic for in the first place."

Clinicians in this group also questioned the legitimacy of patients' needs for the medications or viewed their use as problematic. One primary care clinician noted that "the majority of people who are not drug addicts don't like to take [opioids]. [The people who] every day, they're popping six tablets a day, they're hooked!" The clinician perceived that patients on chronic opioid therapy were often on multiple opioid or benzodiazepine medications, some of which the clinician viewed as inappropriate. They recalled covering for another clinician who had patients whom the clinician described as "Triple V," calling on a Friday at 5 p.m. for their Vicodin (an opioid), Viagra (an erectile dysfunction medication), and Valium (an antianxiety medication). The clinician found the request for the combination of all three medications concerning and questioned whether the patient really needed these medications. **Cautious and Conflicted Prescribers**

We characterized a second group of clinicians as Cautious and Conflicted Prescribers. These doctors approached long-term opioid prescribing cautiously, both in terms of the types of patients they were willing to prescribe to and the approach they took when continuing existing opioid prescriptions. Cautious and Conflicted clinicians were willing to manage new patients on chronic opioid therapy if the dose or medication fell within their "comfort zone," and if they deemed the patient to be trustworthy of managing an opioid prescription safely. Their approach stemmed from a perception that opioids were ineffective for long-term use and harmful, and many explicitly expressed that they would not start a patient on long-term opioid therapy. As a family practice

doctor said: "As far as a chronic pain patient who comes to me not on opiates, I'm never going to be the one to start that."

To appraise the trustworthiness of prospective new patients on chronic opioid therapy, clinicians used information such as whether or not the patient had come from a trusted referral source, their perception of the legitimacy of the patient's pain, and their assessment of existing evidence of potential misuse behavior. Whether the patient came from a trusted referral or was self-referred played an important role in whether clinicians would continue a prescription. Clinicians described agreeing to take on patients on chronic opioid therapy from "reliable," "legitimate," and "trusted" peers. One rheumatologist described their decision-making process:

> There was a patient who was 90 years old-ish and was on Norco, four a day, came to me from another physician who retired and had been on that medication for 15–20 years without changing the dose. [The patient was] compliant in terms of getting the prescription, not requesting more than was asked for, and needs it because [she] has spinal stenosis and didn't seem altered in my meeting her... So, although I'm not entirely comfortable giving a 90-year-old pain medication, it was the natural thing to do rather than stop it.

Self-referrals raised concerns, as clinicians were wary about why the patients were seeking a new provider. Participants expressed trepidation that these patients had misused or abused opioids and had been discharged by their previous physician. They were also concerned that perhaps the relationship had soured with the previous clinician. One internist noted:

> So when we see that new opioid patient, obviously we're not happy about that because we know that they failed with another primary care doctor already.

To understand what had happened with previous doctors, several participants asked for previous records, and if the patient reacted badly to the request, they refused to refill the prescription.

Participants also assessed the legitimacy of the patient's pain or condition when deciding whether to refill a new patient's opioid regimen, looking for whether patients had diagnoses that appeared severe or whether they seemed to demonstrate high levels of pain. One rheumatologist described how patients' severe deformities guided their decision to continue opioid prescription. The clinician said they typically got to know the patient over several months, and when they felt comfortable, they would take over the opioid prescriptions from the former prescriber:

> I have a small cadre of patients who are on opiates because their [rheumatoid arthritis] or even their degenerative disease is just so bad and so deforming and there are just no other options. And those are the patients [for whom] I will continue [the opioid medications].

Clinicians in this group expressed concern for the welfare of their patients on chronic opioid therapy, even when they were conflicted about whether or not the prescription was the ideal regimen for the patient. One internist explained why they continued to refill the medication for a new patient: "I'm his doctor now… you can't leave 'em hanging out to dry." Primary care clinicians in particular expressed how important it was to develop a relationship with new patients to establish continuity of care for all of their concerns. One family practice clinician stated:

> I mean, it's tricky because there are times when even though I feel like it may not be the optimal thing, I'll keep prescribing the medication because I do have this rapport with the patient, particularly if I'm seeing them about other issues. Because I don't want 'em to then [go] off the map for their other issues that I'm treating. You feel like you have a relationship with the patient, so there is sort of just this kinda sympathy thing.

However, the same clinician described conflicted feelings about prescribing long-term opioids:

> I'm trying to really limit it to that… a lot of the patients who I deal with [on] chronic opioid therapy — it's patients whom I've inherited, from when I first started out in practice… as a primary care doctor, I just don't want chronic opioid therapy to be part of my practice, to be honest.

Clinicians in this group also described feeling as though patients were "dumped" on them by other doctors. Numerous clinicians noted that they had inherited patients from surgeons who had started the opioid prescription but no longer wanted to continue prescribing — or, as one rheumatologist described it: "hit-and-run prescribing." Moreover, primary care clinicians described being asked by pain specialists to continue prescribing the patient's opioid medications once the patient was stabilized on a regular dose. Study participants expressed their belief that many pain specialists were unwilling to continue opioid prescriptions for new patients because they had no incentive to do so. There was a perception among participants in this group that anesthesiologists preferred to perform procedures such as injections and nerve blocks, which are more highly reimbursed than doing office visits for opioid refills. Similarly, many participants, including anesthesiologists, felt that surgeons were not incentivized to provide follow-up pain management care for their patients given the low reimbursement rate for office visits. As a result, participants in this group spoke of the lack of trained and willing clinicians to manage patients on chronic opioid therapy as a "big hole in the system." One primary care doctor described how patients on chronic opioid medications bounced around the health care system:

> It's very rare that you find a surgeon that will continue to follow up and manage your pain. They'll end up referring them to a pain specialist if that's the case… But a lot of pain specialists don't do prescriptions, and then that's a frustrating area also… Yeah, so then it's on us to handle the pain meds.

Rapport Builders

Our third group, characterized as the Rapport Builders, prided themselves on developing close relationships and often working collaboratively with patients to decrease doses of opioids that they found unsafe. Like the Cautious and Conflicted Prescribers, these clinicians expressed concern that their patients would be worse off if they didn't continue the prescription. However, in contrast to the other groups, Rapport Builders were more willing to take on patients already on high doses of opioids, often seeing the new relationship as an opportunity to transition patients to a safer dose. They worried that if they didn't become the new prescriber, the patient would end up with a clinician who just refilled the prescription without considering the patient's safety.

Concern about where patients would end up played an important role in how clinicians in this group made decisions about managing new patients on chronic opioid therapy. One family practice clinician explained that they were willing to manage a new patient on opioids even if it wasn't a dose that made them "comfortable in any way, shape, or form." While the dose wasn't within their comfort zone, the clinician worried the patient would end up in a worse situation:

> …if you're not willing to refill that medication and then you're going turn that person on the street and say, 'I'm not going to be your primary care doctor,' well, then that's an opportunity you lost like to transition someone to an appropriate pain control regimen. And if that person's motivated, they will find a doctor who's just gonna write the opioids for them and not care and just say, 'Come back every 30 days. I'll give your script. We won't talk, but I'll just continue refilling this for you.' There are folks out there that do that.

We heard similar concerns from other Rapport Builders who perceived that other clinicians either just refilled the opioids without ensuring the patient's safety or refused to fill the prescription, effectively abandoning the patient. They used these anecdotes as a contrast to their own approach, which they described as collaborative and patient-centered. Unlike the Staunch Opposers, the

Rapport Builders did not see chronic opioid use as a personal failure of the patient. Rather, Rapport Builders attributed the inappropriate opioid prescribing to their predecessors. One family practice clinician described how they believed patients often ended up on chronic opioid therapy:

> I think what happens is if you fail a back surgery, the back surgeon either prescribes you a fentanyl patch or he sends you to his buddy down the street who's a rehab doctor, maybe a pain medicine doc, and you get on some of these things.

Participants in this group described how others might see the patients as "drug seeking" or a "pain in the ass" but noted how some patients were incorrectly diagnosed and therefore incorrectly treated with high doses of opioids. Participants described how finding the right diagnosis and helping the patient transition to more effective, non-opioid medications was highly rewarding. For example, one internist began seeing a new patient who was taking several strong opioids. The clinician eventually identified a new diagnosis for the patient, who subsequently stopped taking opioid medications:

> I found her rheumatoid arthritis, you know, got her the rheumatologist, got her treated, and, you know, so she's now back in the world off of all narcotics.

What also distinguished the Rapport Builders, aside from their willingness to take on patients' opioid prescriptions, was their overall approach to patient care. Several clinicians used language such as "I'm not the boss," as a descriptor of emphasizing patient autonomy and a shared decision-making process when discussing chronic pain treatment. These clinicians also described the importance of building mutually trusting relationships with patients. One family practice physician described how it was important to show patients that they were open to building a relationship and demonstrated this by refilling a patient's opioid prescription:

> I won't refuse a refill on someone who's been taking them for years and years and years. It's kind of like a bad way of starting a trusting relationship with someone that you just met by saying, 'Oh hey, I'm the boss here, and I think things should go this way, and you're going to listen to everything that I say.'

As part of this approach, Rapport Builders described not reducing high-dose opioid regimens until the relationship was established or, in some cases, until the patient was ready for a change. One family practice clinician described getting to know one patient over a year before the patient was ready to change to a less potent pain medication. The clinician explained their approach as working with patients with the goal of eventually reducing their medications:

> It's like, there's psychological research on readiness for change, right? A year ago, they were not ready, or open or willing to look at something in a different way or to change, and then, at some future time, they were.

In sum, we found that study participants in the Rapport Builder group weren't necessarily in favor of keeping patients on high doses of opioids, but they were the most willing of the groups to refill prescriptions for new patients on chronic opioid therapy. Rapport Builders also ascribed responsibility for the high-dose regimens to other physicians instead of the patients. The Rapport Builders, who were mostly primary care clinicians, worked to establish relationships with patients before trying to reduce the doses, often using an approach aimed at empowering patients to manage their care.

DISCUSSION

In this qualitative study of 32 clinicians working in outpatient settings, we found a continuum of how participants made decisions about assuming opioid prescriptions for new patients already on chronic opioid therapy. On the continuum were three groups, including the Staunch Opposers, who were highly averse to managing new patients on opioids, the Cautious and

Conflicted Prescribers, who were willing to continue prescriptions if they perceived the patient was trustworthy and on low and stable opioid therapy, and the Rapport Builders, who were open to assuming prescriptions for new patients already on opioid therapy even if patients were on high doses. The last group emphasized building relationships and working collaboratively with patients to reduce doses.

Our findings demonstrate that there may be an important gap in the health system with regard to managing opioid prescriptions, especially for patients who require more complex tapering regimens and intensive chronic pain management. We found that primary care and non-pain specialty clinicians in the Staunched Opposers and Cautious and Conflicted groups described feeling frustrated that specialists with training in pain medicine did not want to take over opioid prescribing for complex patients or patients on high doses. On the other hand, pain specialists felt that certain clinicians, including primary care clinicians and surgeons, prescribed too many opioid medications and then "dumped" the patients onto pain specialists. With the large number of patients now on chronic opioid therapy, filling this gap will be important to reduce the number of patients at high risk for adverse events. Patients who do not have a referring provider because of conflicts with a previous doctor or a move may have a difficult time finding a clinician willing to take on their opioid prescriptions (20, 22). If clinicians are unwilling to prescribe to these patients, they may go into withdrawal or turn to street drugs. For those developing an addiction — a chronic progressive disease — lack of high-quality treatment may lead to overdose or death (28). Low reimbursement rates for managing chronic opioid therapy may impede proper care (29). Thus, insurance providers and health systems should consider developing incentives that allow specialized clinicians to manage complex pain regimens in an office visit setting.

Additionally, our study touches on the marginalization of patients with chronic pain and especially of those taking opioids or developing substance use disorders. Many participants in our

sample were inclined to refer opioid-using patients out to other providers; this is in line with a prolific literature on clinicians' ambivalence related to treating chronic pain (30-33). As Trait and colleagues (2009) noted in a review about provider judgments of patients in pain, clinicians tend to have more negative attitudes about patients with chronic pain (32). Patients with chronic pain report feeling that clinicians see them as drug-seeking or malingering (34). Other studies have also found that clinicians attribute problems with pain care and opioid prescribing to patients, even as they recognize that there are existing systemic issues in how chronic pain is managed (34). Additionally, in many chronic pain situations, no clear diagnosis exists for the patients' pain, leading to higher levels of suspicion about the legitimacy of the pain and the appropriateness of the pain medications (30, 35-37). Our findings suggest that clinicians may have internalized stigma about treating patients on chronic opioid therapy. To avoid the many issues associated with managing patients on long-term opioid therapy, several clinicians in our study developed strategies to eschew prescribing opioids altogether. However, these strategies may leave many patients already on opioid therapy without access to care.

Our findings are also in line with studies that demonstrate that many clinicians feel low self-efficacy and little professional satisfaction in treating chronic pain (30, 33-35). Better training about pain management, opioid prescribing, and substance use disorders may help clinicians feel greater confidence in treating patients already on chronic opioid therapy. This might increase the number of clinicians who could be characterized as Rapport Builders. Future research might examine the use of methods such as Conversation Analysis (CA), the systematic analysis of talk (38), to examine how Rapport Builders negotiate difficult conversations around dose and tapering with patients. CA has been used effectively to examine interactions between patients and healthcare providers (38, 39) and can provide a deeper understanding of how Rapport Builders work to develop effective and bilateral treatment relationships with patients.

Our findings also touch on the issue of clinical autonomy, or the right of medical professionals to control their clinical performance (40). Prescribing is an activity that differentiates physicians from many other clinical professionals and thus a core component of clinical freedom (40). As some have noted, the act of prescribing (or not prescribing) can thrust clinicians into conflict with those who threaten their autonomy. The act of refusing to prescribe opioids may be a strong assertion of clinical autonomy on the part of certain clinicians within our study. Perceptions of patient expectations about prescriptions are also thought to play an important role in clinician behavior. Bitten and Okomunne (1997) found that physicians' perceptions of their patients' expectations to prescribe were the strongest predictor of their final decision to do so (41). Several clinicians in our sample spoke of having new patients who expected their opioid prescription to be refilled, and clinicians' screening practices may be an attempt to push back against this perceived or actual patient demand.

Our study has some limitations. Our sample of clinicians serve patients of middle-to-high socioeconomic status in an urban area, so the results may be more applicable to clinicians in similar settings. We focused on interviewing clinicians in non-emergency, non-surgical settings because surgeons and emergency clinicians have different guidelines for prescribing, and we thus felt that their prescribing behavior was outside the scope of our study. Still, as a result, our study does not include surgeons' and emergency physicians' perspectives on seeing patients on chronic opioid therapy.

In conclusion, provider concerns and judgments may be contributing to significant systemic issues that affect access for patients on chronic opioid therapy. Our findings provide a basis for designing future research with a much larger sample to corroborate and extend our results. If confirmed, our results foreground a specific need for addressing providers' fears and concerns related to the care of patients on opioids. Attention is needed to address clinicians who have the

most training in pain management since our results indicated they were the least willing to prescribe opioid medications for the long-term. Participants in our sample viewed individuals on long-term opioid therapy in a negative light. Improving pain management training for clinicians in different specialties that focuses on identifying and reducing the stigma surrounding this patient population is needed to address the increasingly complex situation of caring for patients with chronic pain.

Table 1. Study Participant Characteristics: Clinicians Who Prescribe Opioids in the Outpatient Setting (N = 32)	
Mean Years in Practice, mean (range)	19.1 (2-40)
Sex, no. (%)	
Male	18 (56%)
Female	14 (44%)
Clinician Specialty, no. (%)	
Primary Care (e.g. Internal Medicine, Family Medicine)	20 (62%)
Pain Specialist (e.g. Anesthesiology, DDS with Residency in Pain Medicine)	6 (19%)
Non-Pain Specialist (e.g. Neurology, Rheumatology)	6 (19%)
Practice Type*	
Health Maintenance Organization Group	17 (53%)
Private Practice	8 (25%)
Faculty	3 (9%)
Pain Clinic	5 (16%)
*Totals may exceed 100% due to individuals in multiple categories	

References

1. Gourlay DL, Heit HA. Universal Precautions Revisited: Managing the Inherited Pain Patient. Pain Medicine. 2009;10(S2):S115-S23.

2. Centers for Disease Control and Prevention. Annual surveillance report of drug-related risks and outcomes - United States. Centers for Disease Control and Prevention; 2018 August 31, 2018.

3. McCarberg BH, Barkin RL. Long-Acting Opioids for Chronic Pain: Pharmacotherapeutic Opportunities to Enhance Compliance, Quality of Life, and Analgesia. American Journal of Therapeutics. 2001;8(3):181-6.

4. Van Zee A. The Promotion and Marketing of OxyContin: Commercial Triumph, Public Health Tragedy. American Journal of Public Health. 2009;99(2):221-7.

5. Paulozzi LJ, Mack KA, Hockenberry JM. Vital signs: variation among States in prescribing of opioid pain relievers and benzodiazepines - United States, 2012. MMWR Morb Mortal Wkly Rep. 2014;63(26):563-8.

6. Centers for Disease C, Prevention. Annual surveillance report of drug-related risks and outcomes—United States, 2017. Surveillance Special Report. 2017;1(10).

7. International Narcotics Control Board. Report of the International Narcotics Control Board on the availability of internationally controlled drugs: enduring adequate access for medical and scientific purposes. Vienna, Austria: International Narcotics Control Board, 2010.

8. Owens PL, Barrett ML, Weiss AJ, Washington RE, R. K. Hospital Inpatient Utilization Related to Opioid Overuse Among Adults, 1993–2012. HCUP Statistical Brief #177. Rockville, MD: Agency for Healthcare Research and Quality; 2014 August 2014.

9. Rudd R, Aleshire N, Zibbell J, Gladden R. Increases in drug and opioid overdose deaths—United States 2000–2014. Morbidity and Mortality Weekly Report. 2016;64:1374-82.

10. Centers for Disease Control and Prevention. Guideline for Prescribing Opioids for Chronic Pain: Centers for Disease Control and Prevention; 2016 [updated January 6, 2017. Available from: https://www.cdc.gov/drugoverdose/prescribing/guideline.html.

11. Chou R. 2009 clinical guidelines from the American Pain Society and the American Academy of Pain Medicine on the use of chronic opioid therapy in chronic noncancer pain: what are the key messages for clinical practice? Pol Arch Med Wewn. 2009;119.

12. Koes BW, van Tulder M, Lin C-WC, Macedo LG, McAuley J, Maher C. An updated overview of clinical guidelines for the management of non-specific low back pain in primary care. European Spine Journal. 2010;19(12):2075-94.

13. Lembke A, Humphreys K, Newmark J. Weighing the Risks and Benefits of Chronic Opioid Therapy. American family physician. 2016;93(12):982-90.

14. National Conference of State Legislatures. Prescribing policies: States confront opioid overdose epidemic Washington, D.C.2018 [updated April 4, 2018. Available from: http://www.ncsl.org/research/health/prescribing-policies-states-confront-opioid-overdose-epidemic.aspx.

15. Borwein A, Kephart G, Whelan E, Asbridge M. Prescribing Practices Amid the OxyContin Crisis: Examining the Effect of Print Media Coverage on Opioid Prescribing Among Physicians. The Journal of Pain. 2013;14(12):1686-93.e1.

16. Virginia W. Attitudes and knowledge about pain: an assessment of West Virginia family physicians. Fam Med. 2005;37(7):477-80.

17. Nwokeji ED, Rascati KL, Brown CM, Eisenberg A. Influences of attitudes on family physicians' willingness to prescribe long-acting opioid analgesics for patients with chronic nonmalignant pain. Clinical Therapeutics. 2007;29(11):2589-602.

18. Ehley B. How the opioid crackdown is backfiring. Politico. 2018 08/28/2018.

19. Langreth R. Millions of Patients Face Pain and Withdrawal as Opioid Prescriptions Plummet. 2017 November 21, 2017.

20. Kroenke K, Alford DP, Argoff C, Canlas B, Covington E, Frank JW, et al. Challenges with Implementing the Centers for Disease Control and Prevention Opioid Guideline: A Consensus Panel Report. Pain Medicine. 2019.

21. Owston CL. The inherited patient on opioids: A challenge for primary care clinicians. Journal of the American Academy of PAs. 2016;29(10):37-43.

22. Wilbers LE. She Has a Pain Problem, Not a Pill Problem: Chronic Pain Management, Stigma, and the Family—An Autoethnography. Humanity & Society. 2014;39(1):86-111.

23. Charmaz K. Constructing grounded theory: A practical guide through qualitative analysis. Second edition. Thousand Oaks, CA: Sage; 2014 2014.

24. Charmaz K. Constructing grounded theory: a practical guide through qualitative analysis. London: Sage; 2006.

25. Mills J, Bonner A, Francis K. The Development of Constructivist Grounded Theory. International Journal of Qualitative Methods. 2006;5(1):25-35.

26. Corbin J, Strauss A, Strauss AL. Basics of qualitative research: Sage; 2014.

27. Corbin J, Strauss AC. Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory. Thousand Oaks, CA: Sage Publications, Inc.; 2008.

28. Rounsaville BJ, Kosten TR. Treatment for Opioid DependenceQuality and Access. JAMA. 2000;283(10):1337-9.

29. Tompkins DA, Hobelmann JG, Compton P. Providing chronic pain management in the "Fifth Vital Sign" Era: Historical and treatment perspectives on a modern-day medical dilemma. Drug and Alcohol Dependence. 2017;173:S11-S21.

30. Barry DT, Irwin KS, Jones ES, Becker WC, Tetrault JM, Sullivan LE, et al. Opioids, chronic pain, and addiction in primary care. The Journal of Pain. 2010;11(12):1442-50.

31. Jamison RN, Kerry Anne Sheehan BA, Elizabeth Scanlan NP, Ross EL. Beliefs and attitudes about opioid prescribing and chronic pain management: survey of primary care providers. Journal of opioid management. 2014;10(6):375-82.

32. Tait RC, Chibnall JT, Kalauokalani D. Provider Judgments of Patients in Pain: Seeking Symptom Certainty. Pain Medicine. 2009;10(1):11-34.

33. Wasan AD, Wootton J, Jamison RN. Dealing with difficult patients in your pain practice. Regional anesthesia and pain medicine. 2005;30(2):184-92.

34. Upshur CC, Luckmann RS, Savageau JA. Primary Care Provider Concerns about Management of Chronic Pain in Community Clinic Populations. Journal of General Internal Medicine. 2006;21(6):652-5.

35. Spitz A, Moore AA, Papaleontiou M, Granieri E, Turner BJ, Reid MC. Primary care providers' perspectives on prescribing opioids to older adults with chronic non-cancer pain: A qualitative study. BMC Geriatr. 2011;11.

36. Stöver H. Barriers to opioid substitution treatment access, entry and retention: a survey of opioid users, patients in treatment, and treating and non-treating physicians. European Addiction Research. 2011;17(1):44-54.

37. Ziegler SJ. Patient Abandonment in the Name of Opioid Safety. Pain Medicine. 2013;14(3):323-4.

38. Drew P, Chatwin J, Collins S. Conversation analysis: a method for research into interactions between patients and health-care professionals. Health Expectations. 2001;4(1):58-70.

39. Stivers T, Mangione-Smith R, Elliott MN, McDonald L, Heritage J. Why do physicians think parents expect antibiotics? What parents report vs what physicians believe. Journal of Family Practice. 2003;52(2):140-7.

40. Britten N. Prescribing and the defence of clinical autonomy. Sociology of Health & Illness. 2001;23(4):478-96.

41. Britten N, Ukoumunne O. The influence of patients' hopes of receiving a prescription on doctors' perceptions and the decision to prescribe: a questionnaire survey. BMJ (Clinical research ed). 1997;315(7121):1506-10.

CHAPTER 4: Study 3: How does opioid prescribing for low back pain differ between patients with or without contraindications to NSAIDs or relative contraindications to opioids? A retrospective cohort study

ABSTRACT

Background

Given that the risks of opioid therapy are becoming increasingly apparent, primary care physicians are under growing pressure to treat pain with non-opioid medications. Certain individuals may be at higher risk for opioid-related overdose or opioid use disorder based on comorbidities and concurrent prescriptions. Yet non-opioid medications have their own risks. Patients with certain comorbidities and older adults have contraindications to non-steroid anti-inflammatory drugs (NSAIDs). Our aim was to examine whether opioid prescribing at primary care visits differed among patients with and without contraindications to NSAIDs or relative contraindications to opioids.

Methods

We used administrative data from a large tertiary care academic health care system. We identified all outpatient office visits for low back pain from 2013-2017 and sampled the first visit per patient per year (N=21,020 visits). We created separate indicators reflecting contraindications for NSAIDs (kidney, liver, cardiovascular, cerebrovascular, and gastrointestinal diseases, and concurrent use of anticoagulants, antiplatelets, or systemic corticosteroids) and relative contraindications for opioids (depression, anxiety, history of substance use disorder, and concurrent benzodiazepine use). Informed by Raisch's conceptual model of physician prescribing behavior, we also included other patient clinical and sociodemographic factors hypothesized to affect patient receipt of an opioid prescription, including prior use of opioids. In one model, we controlled for previous opioid use. In other models, we stratified by previous opioid use. We used data from the office visit and from encounters one year prior to the visit. We used a generalized estimating equations approach to

account for multiple visits for each patient over the years and included robust standard errors to control for clustering of patients within physicians

Results

Patients received an opioid prescription at four percent of office visits for low back pain (865 of 21,020 visits). After controlling for previous opioid use, patients with kidney disease had 76% higher odds of receiving an opioid during the office visit compared to patients without kidney disease (aOR: 1.76, 95% CI: 1.31-2.36). Patients with long-term or concurrent antiplatelet or anticoagulant medications had 40% higher odds of receiving an opioid during the visit compared to patients not taking these medications (aOR: 1.41, 95% CI: 1.16-1.70). We also found that patients with a history of substance use disorder, a relative contraindication for opioids, had 45% higher odds of receiving an opioid prescription compared to those with no history of substance use disorder (aOR: 1.45, 95%CI: 1.08-1.19), and that patients prescribed a benzodiazepine, also a contraindication for opioids, had 222% higher odds of receiving an opioid prescription compared to patients not prescribed these medications (aOR: 3.22, 95%CI: 2.37-4.37).

Conclusion

We found that visits for low back pain in which patients had selected NSAID contraindications, including kidney disease and concurrent or long-term use of anticoagulants or antiplatelet medications, had higher odds of the receipt of an opioid prescription, reflecting potentially appropriate prescribing. However, visits where patients had relative contraindications for opioids, such as a concurrent benzodiazepine prescription or a history of substance use disorder, had significantly elevated odds of opioid receipt, which indicates that some opioid prescriptions may be inappropriate. Quality improvement methods such as tailored educational outreach should include patient comorbidities to help clinicians and clinical pharmacists identify potentially appropriate and inappropriate opioid prescriptions.

INTRODUCTION

Given that the risks of opioid therapy are becoming increasingly apparent, primary care physicians are under growing pressure to treat pain with non-opioid medications, particularly for certain patient populations. Comorbidities such as mental health disorders or a history of substance use disorders may place patients taking opioids at greater risk for opioid-related overdose or addiction (1). Yet non-opioid medications have their own risks, particularly among individuals with certain comorbidities and older adults (2, 3). Many individuals are unable to use opioid alternatives such as non-steroidal anti-inflammatory drugs (NSAIDs) or other analgesics due to comorbidities or concurrently prescribed medications (3).

To date, however, it is not well understood how clinicians factor in patients' comorbidities and concurrent prescriptions when prescribing opioids. Most studies examining opioid use have focused on patient risk factors associated with long-term opioid use, opioid overdose, or addiction such as mental health and substance use comorbidities; very few have examined patient comorbidities associated with contraindications of non-opioid analgesics (4, 5). Understanding how clinicians incorporate clinical comorbidities into decision-making around opioid prescribing can highlight potentially appropriate or inappropriate prescribing, focusing quality improvement efforts and improving the development of new, more nuanced quality measures (2).

Our study objective was to examine whether patients with contraindications for non-opioid analgesics such as NSAIDs had higher odds of receiving an opioid prescription during an office visit for low back pain. We were also interested in whether patients with comorbidities or concurrent prescriptions that place them at higher risk for overdose or addiction had lower odds of receiving an opioid prescription. We selected to study patients with a low back diagnosis given that there is extensive literature documenting that opioids are often not recommended for this condition (6).

METHODS

Study Setting, Population, and Retrospective Cohort Design

Using administrative data, we created a retrospective cohort of patients with outpatient visits at a large, tertiary care academic health system and its associated primary care clinics. The health system is located in a metropolitan, urban area. Our population sample is primarily insured; most patients have private insurance or Medicare. In 2017, the last year of our study, 42% of the entire population of patients seen at primary and specialty care clinic visits at the medical center had Medicare as their primary payor, 5% had Medicaid, 49% had private insurance, and 3% had a payor classified as "other" (7).

We included all patients with lower back pain diagnoses that had at least one office visit in any year between 2013-2017 and then extracted a year's worth of retrospective data to identify factors associated with receipt of an opioid prescription made during the single primary care office visit. Our unit of analysis was the office visit.

To construct the cohort, we first identified all outpatient office visits for low back pain from 2013-2017 for all patients seen by clinicians affiliated with the health system and sampled the first office visit per patient per year. The office visit was defined as the first time that a patient had a non-emergency, non-perioperative office visit with one of the selected ICD-9 codes identified for low back pain during each calendar year. We then restricted our sample to visits to primary care clinicians. For this visit, we extracted diagnoses, prescribed medications, and demographic data. We also extracted the following data from all visits during the 365 days prior to the visit: opioid prescriptions; prescriptions of anticoagulants, antiplatelets, or systemic steroids; NSAID prescriptions; diagnoses where NSAIDs are contraindicated; and diagnoses where opioids are contraindicated (see Appendices 2 and 3 for a list of specific diagnoses and ICD-9 codes). All data were extracted from a database (Clarity) with electronic health record (EHR) data of the academic

medical center using Structured Query Language (SQL). See Appendix 1 for a detailed description of the data extract.

We excluded the following patient populations: patients under age 18 at the time of office visit, patients with a cancer diagnosis during the study period, patients pregnant during the sampled office visit, patients receiving palliative care, and individuals with vertebral fractures. These patients have specialized analgesic needs and we felt they fell outside the scope of this study as guidelines for opioid prescribing are very different for each group. We used ICD-9 codes (cross-walked with ICD-10 codes in the database) for diagnostic data (See Appendix 1). Our final sample size was 21,020 visits of patients with a low back pain diagnosis among 140 providers from 2013-2017.

Conceptual Model

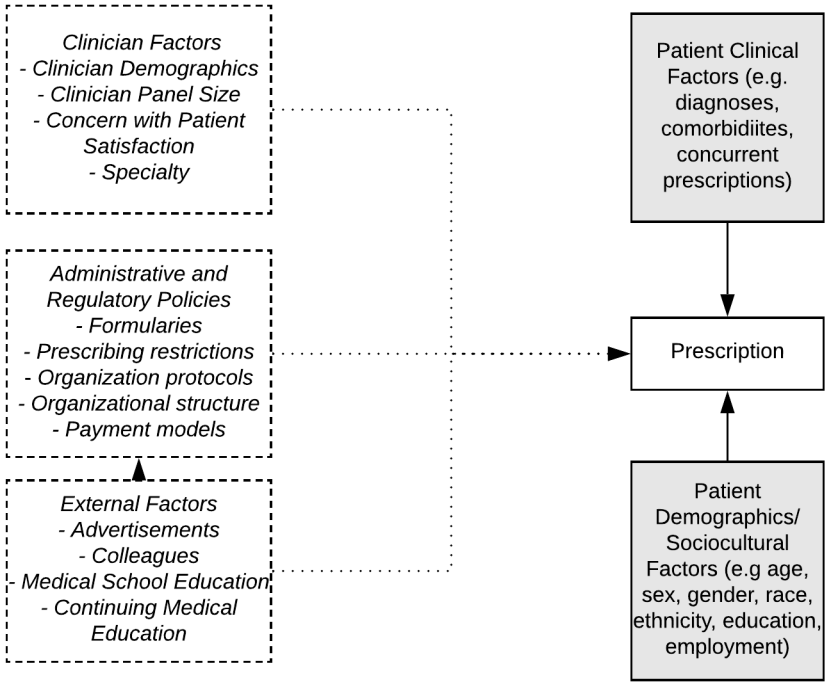
We used a modified version of Raisch's conceptual model of physician prescribing behavior to guide the selection of predictors and covariates (8, 9). In this model, prescribers are thought to be influenced by five categories of factors: patient clinical factors, patient sociodemographic factors, clinician factors, administrative and regulatory policies, and external factors. Patient clinical factors may include chronic pain diagnoses; risk factors for misuse, addiction, and overdose (e.g. diagnoses); condition and treatment history; pain and condition severity; and comorbidities associated with contraindications for non-opioid analgesics. Patient sociodemographic factors include patient race, ethnicity, age, gender, sex, and socioeconomic characteristics such as employment, education, and health literacy levels. Clinician factors include clinician age, gender, race, ethnicity, panel size, and clinician specialty. Administrative and regulatory policies, which Raisch and others call "direct factors," include drug formularies; opioid prescribing restrictions at the local, state, or federal levels; organization protocols, organizational structure, and payment models (10). Organizational protocols may include protocols developed around using prescription database management programs (PDMPs), policies on how many opioids can be prescribed at any one visit, and quality improvement

initiatives aimed at monitoring opioid use at the clinic or physician level. Raisch also included a category of "indirect factors," which he described as advertisements, pharmaceutical sales representatives, colleagues, medical school education, and continuing education programs in chronic pain or opioid prescribing. In the case of opioid prescribing, for example, there is ample literature on the effect of pharmaceutical firms' efforts to promote opioid prescribing (11, 12).

Some factors may explicitly influence prescribing, such as a patient's diagnoses and comorbidities, and others might implicitly influence prescribing, such as a patient's race or socioeconomic status. For example, studies have found that physicians are less likely to prescribe opioids to individuals of color due to potential implicit race bias (13). Some factors such as age might be both clinical factors and demographic factors, as clinicians might consider age in relation to an individual's ability to metabolize medications (clinical factor) and also in implicitly perceiving that younger individuals might be more likely to misuse opioids (sociodemographic factor) (14).

In this study, we focused on patient clinical and sociodemographic factors. While we were not able to model all factors associated with opioid prescribing decisions, since clinicians prescribing to individuals in our sample were all associated with one academic medical center, clinicians in our sample were often subject to similar organizational policies and protocols and the same legislative and regulatory factors.

Figure 1. Conceptual model of factors associated with prescribing decisions



Measures

Primary Outcome: Receipt of Opioid During Index Visit for Low Back Pain

The primary outcome was defined as receipt of an opioid prescription during the primary care office visit for low back pain (yes/no).

Comorbidities and Medication Use for Which Use of NSAIDs is Contraindicated

One of our objectives was to examine visits where an opioid prescription was potentially appropriate, so we examined comorbidities where NSAIDs were contraindicated. We created separate indicators for the presence of comorbidities that have contraindications for NSAIDs, including kidney, liver, gastrointestinal, cardiovascular, and cerebrovascular diseases during the office visit or in the previous 365 days using ICD-9 codes (See Appendix 2 for a list of all of the codes used in this analysis).

Individuals may also be taking certain medications which may interact with NSAIDs or should not be prescribed concurrently due to gastrointestinal adverse effects (15-17). For these individuals, opioid medications may be the more appropriate choice for analgesia. These medications include long-term aspirin use, anticoagulant use, antiplatelet use, and long-term systemic steroid use. We used medications prescribed and ICD-9 codes for long-term use of these medications in the previous 365 days before the office visit to create indicators for each of these medications (Appendix 3).

For certain conditions, anticoagulants, antiplatelets, and systemic steroids are often prescribed for long-term use (18-20). To avoid missing individuals taking these medications chronically (and thus who would be at risk for concurrent use with NSAIDs), we sought to capture patients on long-term use of these medications as well as those with concurrent use. We constructed categories of long-term use of these medications by counting the number of prescriptions before the office visit; if the patient had five or more prescriptions for one of these medication classes in the year prior to the office visit we analyzed, we defined that individual as having a long-term prescription. We created one combined indicator for long-term and concurrent anticoagulant and antiplatelet use and one combined indicator for long-term and concurrent systemic steroid use.

Clinical Factors and Medication Use for Which Opioids are Contraindicated

Tobacco use status and mental health diagnoses, including depression, anxiety, and substance use disorders, are risk factors for opioid use disorder and are thus considered relative contraindications for opioids (4, 21). We used ICD-9 codes previously identified in the literature to identify the presence of these diagnoses during the office visit and in encounters 365 days prior (22, 23). We also examined concurrent benzodiazepine prescriptions, as benzodiazepine and opioid concurrent prescribing is contraindicated due to the high risk of overdose (24). We considered a

benzodiazepine to be concurrently prescribed if it was prescribed at the same office visit as the opioid.

Previous Opioid Use

We created several categories of previous opioid use documented in the EHR: no known opioid use prior to the office visit or no opioid use in the 45 days prior to the office visit; intermittent opioid use (use 45 days or fewer prior to the office visit but not on long-term opioids), and long-term opioid use (60 or more opioid days in the 90 days prior to the office visit) (25).

Patient Sociodemographic Factors

Following our conceptual model, we identified two categories of covariates: patient sociodemographic factors and patient clinical factors. Sociodemographic factors included age, sex, race, ethnicity, employment status, and marital status. Clinical factors also included long-term NSAID use, as we hypothesized that individuals prescribed NSAIDs for long periods of time would be less likely to be prescribed opioid medications as this would be their primary form of pain treatment.

Analyses

We used frequencies to examine univariate statistics. We used chi-square tests to examine associations between our independent and outcome variables. For our main analysis, estimated several logistic regressions. First, we estimated a model controlling for previous opioid use, using the three categories constructed above (no opioid use in the previous 45 days, intermittent opioid use, and long-term opioid use) (Model 1). We then estimated three models (Models 2-4) stratified by previous opioid use (25). To avoid overfitting the models, we included comorbidities and co-prescriptions if the prevalence of the comorbidity or concurrent medication use was higher than 1.5% in our sample. We controlled for the year of the prescription in all models. We used a generalized estimating equations approach to account for multiple visits for each patient over the

years and included robust standard errors to control for clustering of patients within physicians. We assumed an independent correlation matrix. We used the Stata *margins* command to estimate predicted probabilities.

RESULTS

Patient Sociodemographic Factors

Patients received an opioid prescription at four percent of office visits for low back pain (865 of 21,020 visits) (Table 1). Nearly two-thirds of patients at the visits were female (60.8%). The majority of patients at the visits were non-Hispanic (78.8%). 59.6% of patients at the visits were White, 18.6% were Black, 11.2% were Asian/Pacific Islander, and 10.5% were of other racial background. Half of patients at the visits were married, in a domestic partnership, or had a significant other (51.3%). The majority of our sample was working (either employed full-time, part-time, self-employed) or a full-time student (61.4%).

Patient Sociodemographic Factors and Unadjusted Associations with Receipt of Opioid Prescription

In the area of patient sociodemographic factors, the most notable associations were with regards to race and marital status. We found a significant association between race and receipt of an opioid at the primary care office visit. Of those individuals who received an opioid prescription at the office visit versus those who did not, higher proportions were Black individuals (26.6% versus 18.3%). In contrast, while Asian/Pacific Islander patients made up 11.2% of the sample, 5.7% of patients receiving an opioid prescription were Asian/Pacific Islander. We also found a significant association between marital status and receipt of an opioid prescription at the office visit. Of those individuals who received an opioid at the visit versus those who did not, higher proportions were divorced, legally separated, or widowed (19.3% vs. 13.4%).

Prevalence of Comorbidities and Concurrent Medication Use for Which Use of NSAIDs are Contraindicated

Among our sample, 69.9% of patients at visits had at least one comorbidity or long-term and/or concurrent prescription where NSAIDs were contraindicated. Relatively small proportions of our sample had kidney disease (5.8%) or liver disease (1.8%). Higher proportions had cardiovascular or cerebrovascular disease (9.6%) and gastrointestinal disorders (10.8%).

We also examined the proportion of patients at the visits who were prescribed medications contraindicated with NSAIDs during the office visit or had long-term use of these medications. Nearly half of our sample (48.1%) was either prescribed a systemic steroid at the visit or had been prescribed 5 or more systemic steroid prescriptions in the previous 365 days prior to the visit. Anticoagulant and antiplatelet use was also high: 59.5% of individuals were taking these medications at the visit or were long-term users in the previous 365 days prior.

Comorbidities and Concurrent Medication Use for Which Use of NSAIDs are Contraindicated and Unadjusted Associations with Receipt of Opioid Prescription

Among the comorbidities, the only notable associations between a contraindication for NSAIDs and receipt of an opioid prescription during the visit were for kidney disease and cardiovascular or cerebrovascular disease. Of those who received an opioid prescription at the visit versus those who did not receive an opioid, higher proportions had kidney disease (10.1% versus 5.6%) or cardiovascular/cerebrovascular disease (11.3% versus 9.5%).

Noteworthy associations between medication use and prescription of an opioid at the visit included systemic steroid use and antiplatelet/anticoagulant use. Of those who received an opioid at the visit versus those who did not, higher proportions had concurrent or chronic systemic steroid use (48.7% versus 32.5%), and concurrent or long-term antiplatelet or anticoagulant use (60.2% versus 54.1%).

Comorbidities and Medication Use Associated with Relative Contraindications for Opioids

Nearly one third of our sample (28.6%) had at least one comorbidity or concurrent medication associated with risk of opioid use disorder or overdose, relative contraindications for opioids. The prevalence of comorbidities associated with opioid use, opioid overdose, and opioid use disorder was relatively high in our sample. 10.3% of patients in our sample had a depression disorder diagnosis, 14.0% had an anxiety disorder diagnosis, and 6.2% had a substance use diagnosis. The majority of our sample had never used tobacco (69.9%) or had used tobacco and quit (21.8%). A small proportion were current tobacco users (8.3%). We found that 2.6% of patients were prescribed a benzodiazepine at the office visit.

Comorbidities and Medication Use Associated with Relative Contraindications for Opioids and Unadjusted Associations with Receipt of Opioid Prescription

A higher proportion of those who received an opioid during the visit had depression disorders (12.8% vs 10.2%), anxiety disorders (17.5% vs 13.9%), substance use disorders (12.9% vs 5.9%), or received a prescription for a benzodiazepine during the visit (8% vs 2.4%). Of those who received an opioid at the visit versus those who did not receive an opioid, higher proportions were current smokers (12.9% vs 8.1%).

Prior Opioid Use

The majority of patients in our sample (93.2%) had no known opioid use 45 days prior to the visit. Approximately 5% were intermittent opioid users and 1.9% were long-term opioid users prior to the visit.

Adjusted Odds Ratios Between Contraindications for NSAIDs and Receipt of Opioid Prescription

As noted earlier, we estimated four separate logistic regression models (Table 5). Model 1 included the full sample of visits for low back pain, adjusting for previous opioid use (N = 21,020).

Models 2-4 were stratified according to opioid use prior to the office visit: no known opioid use 45 days prior to the visit (N = 19,587), intermittent opioid use (N=1,042), or long-term opioid use (N=391).

Adjusted Odds of Opioid Prescription and Sociodemographic Factors

We found a modest positive association between patient sex and receipt of an opioid prescription at the visit among our full sample after controlling for previous opioid use, with males having higher odds of receiving an opioid prescription (Model 1, aOR: 1.18; 95% CI: 1.01-1.39) compared to females. We also found differences in the adjusted odds of receipt of an opioid prescription by race: compared to White patients, Black patients had 35% higher odds of receiving an opioid prescription across the full sample after controlling for prior opioid use (Model 1, aOR: 1.35, 95% CI: 1.12-1.63), and 41% higher odds compared to White patients among those with no known opioid use 45 days prior to the visit (Model 2, aOR: 1.41, 95% CI: 1.14-1.74).

Compared to White patients, Asian-American patients had 39% lower odds of receiving an opioid prescription across the full sample after controlling for prior opioid use (Model 1, aOR: 0.61, 95% CI: 0.43-0.87) and 35% lower odds of receiving an opioid prescription if they had no known prior opioid use 45 days prior to the visit (Model 2, aOR: 0.65, 95% CI: 0.45-0.96).

We also found that marital status was an important factor associated with receiving an opioid prescription during a primary care visit for low back pain. Compared to single patients, patients who were divorced, separated, or widowed had 50% higher odds of receiving an opioid prescription during the visit (Model 1, aOR: 1.50, 95% CI: 1.19-1.89). This association held for those with no known opioid use 45 days prior to the visit (Model 2, aOR: 1.53, 95% CI: 1.16-2.02), but not for those with intermittent or long-term opioid use. Among individuals who had intermittent opioid use, patients who were disabled or had never worked had 122% higher odds of receiving an opioid

prescription than patients who were employed or full-time students (Model 3, aOR: 2.22, 95% CI: 1.04-4.76).

Adjusted Odds of Opioid Prescription and Comorbidities and Concurrent Medication Use for Which Use of NSAIDs is Contraindicated

After adjusting for prior opioid use, we found that patients with kidney disease had 76% higher odds of receiving an opioid prescription during the visit, compared to patients with no kidney disease, after controlling for previous opioid use (Model 1, aOR: 1.76; 95% CI: 1.31-2.35). This translates to a difference in the predicted probability of receiving an opioid of 2.6% between individuals with kidney disease and individuals without kidney disease (6.6% vs. 4.0%). We report all predicted probabilities in Appendix Table 5. The same positive association and similar magnitude held for those with no known opioid use 45 days prior to the visit and those who had intermittent opioid use. Among long-term users, the association was of similar magnitude, but was not statistically significant.

We also found that having a long-term or concurrent anticoagulant/antiplatelet prescription was associated with 41% higher odds of receiving an opioid prescription during the visit for the full sample, after controlling for previous opioid use (Model 1, aOR: 1.41, 95% CI: 1.18-1.90). This translates to a 1.3% difference in the predicted probability of receiving an opioid prescription between those with long-term or concurrent anticoagulant/antiplatelet use versus those without this type of medication use (4.4% vs. 3.7%). We found a similar positive association and magnitude for patients who had no prior opioid use 45 days to the visit and those with intermittent opioid use. Among long-term opioid users, having a concurrent or long-term anticoagulant/antiplatelet prescription was associated with 117% higher odds of receiving an opioid prescription at the visit (Model 4, aOR: 2.17, 95% CI: 1.17-4.02).

Other comorbidities or concurrent medications considered contraindications for NSAIDs — including having a diagnosis of liver disease, cardiovascular or cerebrovascular disease, or gastrointestinal disorders, or having a concurrent or long-term systemic steroid prescription — were not found to be associated with higher odds of receiving an opioid prescription during the visit in our models either controlling for previous opioid use or stratified by previous opioid use.

Adjusted Odds of Opioid Prescription and Comorbidities and Medication Use Associated with Relative Contraindications for Opioids

Having a history of or current substance use disorder was associated with 45% higher odds of receiving an opioid prescription at the office visit in the full sample after controlling for previous opioid use (Model 1, aOR: 1.45, 95% CI: 1.08-1.94). This translates to a 2.6% difference in the predicted probability of receiving an opioid prescription between those with a history of substance use disorder and those without such a history (6.6% vs. 4.0%). We found a similar magnitude of results among those with no opioid use 45 days prior to the visit (aOR: 1.65, 95% CI: 1.27-2.13). We also found that receiving a benzodiazepine prescription was positively associated with receiving an opioid prescription during the visit across all models, including the full sample after controlling for previous opioid use (Model 1, aOR: 3.22, 95% CI: 2.37,4.37). This translates to a 7.0% difference in the predicted probability of receiving an opioid prescription between those with a concurrent benzodiazepine prescription versus those without (10.89% vs. 4.0%). We had similar findings among patients with no known opioid use 45 days prior to the office visit (Model 2, aOR: 3.01, 95% CI: 2.25-4.15), patients with previous intermittent opioid use (Model 3, aOR: 3.50, 95% CI: 1.27-9.90), and previous long-term use (Model 4, OR: 5.13, 95% CI: 1.76-14.97).

We also found that tobacco use was positively associated with receipt of an opioid prescription at the visit in both our full sample and among those who had intermittent opioid use. Compared to never tobacco users, patients who were current tobacco users had 26% higher odds of

receiving an opioid prescription during the visit after controlling for previous opioid use (aOR: 1.26, 95% CI: 1.07-1.48), and 79% higher odds among patients with intermittent prior opioid use (aOR: 1.79, 95% CI: 1.21-2.65).

DISCUSSION

In this retrospective cohort study of primary care visits of patients with low back pain, we examined comorbidities and concurrent prescriptions associated with both appropriate and inappropriate opioid prescribing, finding that clinicians did incorporate some important comorbidities and prescriptions when prescribing, including kidney disease, anticoagulant, and antiplatelet use, but missed or did not consider some important comorbidities and prescriptions associated with opioid overdose or addiction, including substance use disorder and concurrent benzodiazepine use.

These are concerning findings because they illustrate that patients at higher risk for overdose or addiction might be receiving inappropriate opioid prescriptions. The risks of overdose and death increase significantly when patients are concurrently prescribed opioids and benzodiazepines (26, 27). While patients with a history of substance use can still be prescribed opioids if followed closely (28), some patients can develop opioid use disorders when prescribed opioid medications (29). Individuals with mental health conditions are at significantly higher risk for substance use disorders overall, so avoiding unnecessary opioid prescriptions for these patients may be advised (1). Health systems and provider groups might consider additional training in opioid prescribing and academic detailing to help clinicians identify patients at highest risk for opioid overdose or misuse.

Our findings also illustrated that clinicians are using patient comorbidities to make appropriate prescribing decisions. Various organizations and federal agencies are developing quality measures to examine prescribing at the system, facility, and provider levels (25, 30, 31). These measures are aimed at assisting health system leaders in identifying variation in prescribing levels

among clinicians in an effort to ultimately decrease initial opioid prescribing and long-term opioid use (25). However, an important limitation of these measures is that they do not distinguish between potentially inappropriate and potentially appropriate opioid prescribing. These quality measures may penalize clinicians, such as geriatricians, who treat a higher proportion of older patients with kidney disease or who are on anticoagulants or antiplatelet medications. Developing quality measures that incorporate patient comorbidities will more accurately capture appropriate and inappropriate prescribing.

Our findings are in line with previous studies examining risk factors associated with opioid prescribing, addiction, and overdose. Others have found opioid prescriptions to be associated with nicotine use, depression, use of benzodiazepines, mood disorders, and history of substance use disorder (29, 32-34). Our findings regarding marital status and employment status are also in line with other studies, which found that divorced individuals and individuals on disability were more likely to be persistent opioid users (35).

Our study has several limitations. Although we aimed to capture prior opioid use as accurately as possible, we may not have captured opioids prescribed outside of the health system. However, many prescribers enter recent or concurrent prescriptions into the EHR during the medication reconciliation portion of the visit, so we were able to capture prescriptions identified by the patient during the visit. We may also have missing diagnoses and medications for patients if they sought care outside of the system. However, we used data from visits 365 days prior to the visit, which improves our ability to identify diagnoses and long-term medication use. We also included an extensive list of comorbidities, many of which had not been explored in papers focused on opioid prescribing. There are also limitations inherent in using administrative data, including diagnoses or prescriptions that are noted by providers in free-text notes, which we were not able to include in this analysis. Finally, our study data was limited to one academic medical system with a predominantly

insured population in a large metropolitan area, so findings may not be generalizable to rural settings or low resource settings.

In conclusion, our findings suggest that clinicians are considering some clinical comorbidities to make decisions about opioid prescribing for low back pain, including the presence of kidney disease and concurrent use of anticoagulants and antiplatelet medications, suggesting appropriate opioid prescribing. However, we also found that patients receiving a benzodiazepine prescription or with a history of substance use disorder had higher odds of receiving an opioid prescription, which indicates that some opioid prescriptions may place vulnerable patients at risk for overdose, addiction, or even death. Clinicians, pharmacists, and health system administrators should identify comorbidities and concurrent medication use during quality improvement initiatives to classify potentially appropriate and inappropriate opioid prescribing.

Table 1. Characteristics of Patients with Visits for Low Back Pain, 2013-2017, N=20,210

	No Opioid Receipt at Index Visit	Opioid Receipt at Index Visit	Total Sample	P-Value
	N (%)	N (%)	N	
Total	20,155 (96)	865 (4)	21020 (100)	
Patient Demographic, Sociocultural, and Clinical Factors				
Age				
Under Age 65	14909 (74)	630 (72.8)	15539 (73.9)	
Age 65 and Older	5246 (26)	235 (27.2)	5481 (26.1)	0.45
Sex				
Female	12289 (61)	493 (57)	12782 (60.8)	
Male	7866 (39)	372 (43)	8238 (39.2)	0.02
Hispanic Ethnicity				
Non-Hispanic	15867 (78.7)	696 (80.5)	16563 (78.8)	
Hispanic	3196 (15.9)	125 (14.5)	3321 (15.8)	
Unknown/Refused	1092 (5.4)	44 (5.1)	1136 (5.4)	0.47
Race				
White	12023 (59.7)	507 (58.6)	12530 (59.6)	
Black	3690 (18.3)	230 (26.6)	3920 (18.6)	
Asian/Pacific Islander	2305 (11.4)	49 (5.7)	2354 (11.2)	
Other/Unknown	2137 (10.6)	79 (9.1)	2216 (10.5)	<0.001
Marital Status				
Single	6344 (31.5)	250 (28.9)	6594 (31.4)	
Married, Domestic Partnership, or Significant Other	10358 (51.4)	420 (48.6)	10778 (51.3)	
Divorced, Legally Separated, or Widowed	2692 (13.4)	167 (19.3)	2859 (13.6)	
Other/Unknown	761 (3.8)	28 (3.2)	789 (3.8)	<0.001
Employment Status				
Full Time, Self-Employed, Part-Time, Full-Time Student	12391 (61.5)	508 (58.7)	12899 (61.4)	
Retired	3758 (18.6)	175 (20.2)	3933 (18.7)	
Disabled or Never Worked	951 (4.7)	60 (6.9)	1011 (4.8)	
Not Employed, Unknown, or Missing	3055 (15.2)	122 (14.1)	3177 (15.1)	0.1
Index or Chronic NSAID Use				
No	10136 (50.3)	571 (66)	10707 (50.9)	
Yes	10019 (49.7)	294 (34)	10313 (49.1)	<0.001

Table 1, continued.

Contraindications for NSAIDs	No Opioid Receipt at Index Visit	Opioid Receipt at Index Visit	Total Sample	P-Value
	N (%)	N (%)	N	
Kidney Disease				
None	19030 (94.4)	778 (89.9)	19808 (94.2)	
Diagnosed	1125 (5.6)	87 (10.1)	1212 (5.8)	<0.001
Liver Disease				
None	19783 (98.2)	850 (98.3)	20633 (98.2)	
Diagnosed	372 (1.8)	15 (1.7)	387 (1.8)	0.81
Cardiovascular or Cerebrovascular Disease				
None	18241 (90.5)	767 (88.7)	19008 (90.4)	
Diagnosed	1914 (9.5)	98 (11.3)	2012 (9.6)	0.07
Gastrointestinal Disorder, including GERD, Peptic Ulcers, or Bleeding				
None	17972 (89.2)	774 (89.5)	18746 (89.2)	
Diagnosed	2183 (10.8)	91 (10.5)	2274 (10.8)	0.77
Index or Chronic Systemic Steroid Use				
No	10333 (51.3)	584 (67.5)	10917 (51.9)	
Yes	9822 (48.7)	281 (32.5)	10103 (48.1)	<0.001
Index or Chronic Anticoagulant or Antiplatelet Use				
No	8027 (39.8)	397 (45.9)	8424 (40.1)	
Yes	12128 (60.2)	468 (54.1)	12596 (59.9)	<0.001
Contraindications for Opioids				
Depression Disorder				
No	18101 (89.8)	754 (87.2)	18855 (89.7)	
Yes	2054 (10.2)	111 (12.8)	2165 (10.3)	0.01
Anxiety Disorder				
No	17357 (86.1)	714 (82.5)	18071 (86)	
Yes	2798 (13.9)	151 (17.5)	2949 (14)	<0.01
Substance Use Disorder				
No	18959 (94.1)	753 (87.1)	19712 (93.8)	
Yes	1196 (5.9)	112 (12.9)	1308 (6.2)	<0.001
Benzodiazepine Prescribed at Index Visit				
No	19674 (97.6)	796 (92)	20470 (97.4)	
Yes	481 (2.4)	69 (8)	550 (2.6)	<0.001
Tobacco User				
Never Smoker	14170 (70.3)	523 (60.5)	14693 (69.9)	
Ever Smoker, Quit	4347 (21.6)	230 (26.6)	4577 (21.8)	
Ever Smoker, Current	1638 (8.1)	112 (12.9)	1750 (8.3)	<0.001

Table 1, continued

	No Opioid Receipt at Index Visit	Opioid Receipt at Index Visit	Total Sample	P-Value
Opioid Use Prior to the Index Visit	N (%)	N (%)	N	
No Opioid Use 45 Days Prior to Index Visit	18,965 (96.8)	631 (3.2)	19,587 (93.2)	
Intermittent Opioid Use Prior to Index Visit	903 (86.7)	139 (13.3)	1,042 (4.96)	
Long-Term Opioid Use Prior to Index Visit	296 (75.7)	95 (24.3)	391 (1.86)	<0.001

Table 2. Adjusted odds ratios between contraindications for NSAIDs and opioids and receipt of an opioid prescription at a primary care office visit for low back pain

Outcome: Receipt of an opioid prescription at a primary care visit for low back pain.	(1)	(2)	(3)	(4)
	Full Sample	Opioid Naive	Intermittent Opioid Use	Long-Term Use
Kidney Disease	1.758***	1.686***	1.998*	1.537
	[1.308,2.364]	[1.240,2.294]	[1.071,3.727]	[0.452,5.219]
Liver Disease	0.744	0.696	0.529	0.505
	[0.462,1.198]	[0.334,1.448]	[0.0922,3.038]	[0.0852,2.989]
Cardiovascular or Cerebrovascular Disease	0.867	0.979	0.544	0.704
	[0.670,1.122]	[0.736,1.301]	[0.278,1.064]	[0.340,1.455]
Gastrointestinal Disorder	0.801	0.831	0.758	0.579
	[0.631,1.018]	[0.619,1.115]	[0.435,1.320]	[0.229,1.464]
Index or Chronic Steroid Prescription	0.623	0.519	0.545	0.865
	[0.379,1.026]	[0.260,1.035]	[0.217,1.365]	[0.343,2.180]
Chronic NSAIDs Prescription	0.839	0.906	1.422	0.843
	[0.529,1.332]	[0.463,1.770]	[0.576,3.513]	[0.416,1.709]
Index or Chronic Anticoagulant or Antiplatelet Prescription	1.406***	1.498***	1.210	2.172*
	[1.162,1.702]	[1.182,1.898]	[0.741,1.976]	[1.172,4.023]
Depression	0.929	0.956	1.023	1.187
	[0.731,1.180]	[0.748,1.222]	[0.590,1.773]	[0.504,2.797]
Anxiety	0.820	0.889	0.463*	1.012
	[0.671,1.001]	[0.683,1.158]	[0.249,0.860]	[0.621,1.648]
Substance Use	1.448*	1.645***	0.954	1.112
	[1.081,1.941]	[1.272,2.128]	[0.428,2.125]	[0.532,2.325]
Benzodiazepine Concurrently Prescribed	3.217***	3.055***	3.551*	5.126**
	[2.367,4.373]	[2.249,4.151]	[1.274,9.898]	[1.756,14.97]
Age				
Under Age 65	--	--	--	--
Age 65 and Older	0.818	0.745*	1.055	0.868
	[0.649,1.031]	[0.582,0.954]	[0.520,2.141]	[0.356,2.116]
Patient Sex				
Female	--	--	--	--
Male	1.183*	1.153	1.108	1.536
	[1.011,1.384]	[0.986,1.350]	[0.768,1.598]	[0.898,2.625]
Patient Race				
White	--	--	--	--
Black	1.354**	1.405**	1.117	1.739
	[1.122,1.634]	[1.135,1.740]	[0.763,1.634]	[0.952,3.178]
Asian/Pacific Islander	0.611**	0.652*	0.485	0.555
	[0.428,0.873]	[0.445,0.955]	[0.179,1.315]	[0.0333,9.249]
Other	0.939	0.905	1.148	0.578
	[0.685,1.289]	[0.625,1.309]	[0.552,2.388]	[0.219,1.522]
Patient Hispanic Ethnicity				
Non-Hispanic	--	--	--	--
Hispanic	1.003	1.061	0.745	1.228
	[0.805,1.250]	[0.823,1.368]	[0.424,1.310]	[0.536,2.814]
Unknown	1.123	1.035	1.601	1.234
	[0.803,1.570]	[0.705,1.518]	[0.471,5.444]	[0.301,5.057]

Table 2, continued				
Patient Marital Status				
Single	--	--	--	--
Married/Domestic	1.137	1.134	1.556	0.803
Partnership/Significant Other	[0.959,1.349]	[0.942,1.364]	[0.991,2.441]	[0.454,1.422]
Divorced/Separated/Widowed	1.500***	1.533**	1.527	1.097
	[1.194,1.883]	[1.162,2.023]	[0.940,2.479]	[0.415,2.901]
Other/Unknown	1.158	0.961	1.666	20.31*
	[0.756,1.773]	[0.545,1.696]	[0.574,4.840]	[1.868,220.7]
Patient Employment				
Employed or Full-Time Student	--	--	--	--
Retired	0.950	1.007	1.112	0.593
	[0.697,1.295]	[0.732,1.386]	[0.506,2.442]	[0.210,1.676]
Disabled/Never Worked	0.943	0.922	2.225*	0.204**
	[0.642,1.385]	[0.615,1.380]	[1.041,4.755]	[0.0711,0.583]
Not Employed/Unknown	0.869	1.022	0.681	0.305
	[0.704,1.073]	[0.816,1.280]	[0.320,1.450]	[0.0831,1.116]
Tobacco Use				
Never User	--	--	--	--
Ever User, Current	1.256**	1.145	1.793**	1.333
	[1.066,1.480]	[0.939,1.397]	[1.212,2.652]	[0.702,2.530]
Ever User, Quit	1.256	1.284	1.339	1.117
	[0.948,1.664]	[0.956,1.725]	[0.651,2.753]	[0.518,2.405]
Opioid naïve	Reference			
Intermittent Opioid Use	3.662***			
	[2.871,4.671]			
Long-Term Opioid Use	6.794***			
	[4.756,9.706]			
N	21020	19587	1042	391

Exponentiated coefficients; 95% confidence intervals in brackets. Our models also controlled for the year of the visit.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Study 3 Appendix Table of Contents

Appendix 1. Office Visit Extract Description

Office Visit

For the visit, we extracted medical record number (MRN), visit date, the visit encounter number, provider identification number, provider name, provider specialty, department name, birth date, sex, ethnic group, race, marital status, zip, employment status, most updated BMI, tobacco use. We dropped observations where the visit was for acupuncture, a dietitian, or where the provider specialty was missing. Since our aim was to capture opioid prescribing in the primary care setting, if the first visit for low back pain within that year occurred elsewhere (e.g., emergency department, inpatient, hospital outpatient, pre-operative and post-operative, infusion, or prenatal visit), we looked at the next office visit. If the patient had no eligible office visits during the calendar year, the individual was excluded from the analysis.

Office Visit Opioid and Benzodiazepine Prescriptions

Using the office visit prescription data, we created variable where at least one opioid was prescribed. We also created variable where at least one benzodiazepine was prescribed.

Office Visit Inclusion and Exclusion Codes

Below, we list the ICD-9 codes used as inclusion and exclusion criteria we used to create a cohort of patients for this retrospective observational cohort study.

Appendix Table 1. Office Visit Low Back Pain Inclusion International Classification of Disease (ICD) 9 Codes and Descriptions

ICD-9 Inclusion Codes	**Description**
719.xx	Joint Pain
720.1	Enthesopathy, spinal
720.2	Sacroiliitis NEC
720.9	Spondylopathy, inflammatory NOS
721.3	Spondylosis, lumbosacral
721.42	Spondylosis, lumbar w/myelopathy
721.6	Ankylosing vertebral hyperostosis
721.7	Spondylopathy, traumatic
721.8	Disorder, spinal NEC
721.9	Spondylosis NOS
721.9	Spondylosis NOS without myelopathy
722	Disorders, intervertebral disc
722.1	Displacement of thoracic/lumbar intervertebral disc without myelopathy

722.1	Displacement of thoracic or lumbar intervertebral disc without myelopathy
722.2	Displacement of intervertebral disc, site unspecified, without myelopathy
722.32	Schmorl's nodes, lumbar region
722.5	Degeneration, thoracic/lumbar disc
722.52	Degeneration, lumbar/lumbosacral disc
722.6	Degeneration, disc NOS
722.7	Intervertebral disc disorder with myelopathy
722.7	Intervertebral disc disorder with myelopathy, unspecified region
722.73	Intervertebral disc disorder with myelopathy, lumbar region
722.8	Postlaminectomy syndrome
722.83	Syndrome, postlaminectomy, lumbar
722.9	Disorder, intervertebral disc, other and unspecified
722.9	Disorder NEC/NOS, unspecified disc
722.93	Disorder NEC/NOS, lumbar disc
724	Stenosis, spinal, other than cervical
724	Stenosis, spinal, unspecified region
724	Disorders, back, other and unspecified
724.02	Stenosis, spinal, lumbar
724.09	Stenosis, spinal, other
724.1	Pain in thoracic spine
724.2	Lumbago
724.3	Sciatica
724.4	Neuritis, lumbosacral NOS
724.5	Backache NOS
724.6	Disorders, sacrum (including lumbosacral joint instability)
724.7	Disorders, coccyx
724.71	Hypermobility, coccyx
724.79	Disorder, coccyx NEC
724.8	Symptom, back NEC
724.9	Disorder, back NOS
728.2	Atrophy, muscular disuse NEC
728.8	Disorders, muscle/ligament/fascia
728.85	Spasm, muscle
728.9	Disorder, muscle/ligament NOS
729.1	Myalgia/myositis NOS
729.2	Neuralgia/neuritis NOS
729.9	Disorder, soft tissue NEC/NOS
733.13	Pathologic fracture of vertebrae
737.3	Kyphoscoliosis and scoliosis
737.3	Scoliosis, idiopathic
737.39	Scoliosis NEC

738.4	Spondylolisthesis, acquired
738.5	Deformity, acquired, back/spine NEC
739.3	Lesion, nonallopathic, lumbar region
739.4	Lesion, nonallopathic, sacral region
756.1	Anomaly, congenital, spine
756.1	Anomaly, congenital, spine NOS
756.11	Spondylolysis, congenital, lumbosacral
756.12	Spondylolisthesis, congenital
756.15	Fusion, spine, congenital
793.7	Nonspecific abnormal radiological finding, musculoskeletal system
799.8	Condition, ill-defined NEC
839.2	Dislocation, thoracic/lumbar vertebra, closed
839.2	Dislocation of lumbar vertebra, closed
839.42	Dislocation, sacrum, closed
839.69	Dislocation site NEC, closed
839.8	Dislocation, multiple and ill-defined, closed
846	Sprain/strain, sacroiliac region
846	Sprain/strain, lumbosacral
846.1	Sprain/strain, sacroiliac ligament
846.2	Sprain/strain, sacrospinatus
846.3	Sprain/strain, sacrotuberous
846.8	Sprain/strain, sacroiliac site NEC
846.9	Sprain/strain, sacroiliac site NOS
847	Sprains/strain other/unspecified parts back
847.2	Sprain/strain, lumbar region
847.3	Sprain/strain, sacrum
847.4	Sprain/strain, coccyx
847.9	Sprain/strain, back NOS
848.8	Sprain/strain NEC
848.9	Sprain/strain NOS
905.7	Late effect, sprain/strain
922.3	Contusion, back
922.31	Contusion, back
922.32	Contusion, buttock
922.9	Contusion, trunk NOS
953.2	Injury, lumbar root
953.5	Injury lumbosacral plexus
956	Injury sciatic nerve
959.1	Injury NOS, trunk
959.19	Injury NOS, other sites trunk

ICD-9 Exclusion Codes	**Description**

(140.0-239.9) OR (338.3);	Patients with a cancer diagnosis during study period, ICD-9 codes
(V667)	Patients receiving palliative care administered 6 months prior to the study period or during the study period
324.1	Intraspinal abscess
730	Osteomyelitis
805.1	Open vertebral fractures
805.3	Open vertebral fractures
805.5	Open vertebral fractures
805.7	Open vertebral fractures
805.9	Open vertebral fractures

Appendix 2: Comorbidities and Prescriptions from Office Visit and Visits 365 Days Prior

Below, we list the ICD-9 codes we used to categorize diagnoses during the primary care office visit and from all visits recorded in the electronic health record 365 days prior.

Appendix Table 2. ICD-9 Codes Used to Create Comorbidity and Chronic Prescription Data at the Office Visit and From Visits 365 Days Prior	
ICD-9 Code	Description
GI Conditions	
530, 531, 578	Gastroesophageal reflux disease (530), Gastrointestinal ulcer (531), Gastrointestinal bleeding (578)
Kidney Conditions	
584, 585, 584* 585* 586* 593* 403* V4511 V4512 V56*	kidney disease (585), renal failure (586), unspecified kidney disease (593), hypertensive chronic kidney disease (403), dialysis
Inflammatory Bowel Disease	
555*, 556*	Crohn's Disease (555), UC (556)
Liver Conditions	
571*	Liver Disease (571)
Gastric bypass or gastroplasty	
V45.86	Bariatric surgery status (V45.86)
Pregnancy	
V22*	Pregnancy (V22*)
Cardiovascular disease	
410* 411* 412* 413* 414* 428* 430* 431* 432* 433* 434* 435* 436* 437* 438* 443.9 433.10 440.9	acute myocardial infarction 410 other acute and subacute forms of ischemic heart disease 411 intermediate coronary syndrome 411.1 old myocardial infarction 412 angina* 413.0 coronary atherosclerosis 414.00 Congestive heart failure, unspecified 428.0 Cerebrovascular Disease 430-438 Peripheral vascular disease, unspecified 443.9 Occlusion and stenosis of carotid artery without mention of cerebral infarction 433.10 Generalized and unspecified atherosclerosis 440.9
Long-Term Use of Aspirin	
V5869	Long-term aspirin use
Long-Term Anticoagulant Use	
V5862	Long-term anticoagulant use

Appendix 3. Office Visit and Prior Visit Medication Use

We used two sources of medication data to create the indicators in our final models. We used prescriptions from 365 days prior to the office visit and medications concurrently prescribed at the visit. We excluded medications labeled "suspend." We included medications that were not ordered but entered into the chart as "provider historical," as these were entered in the record during the medication reconciliation.

Appendix Table 3. Medication Classes Used to Identify Medications Concurrently Prescribed During the Office visit and from Outpatient Visits 365 Days Prior	
Medication Class	Examples
NSAIDs	Ibuprofen, celecoxib
Antiplatelets	Clopidogrel, ticagrelor
Anticoagulants	Heparin, warfarin
Systemic Corticosteroids	Prednisone, prednisolone

Appendix 4. Opioid Prescription Calculation Assumptions

Data Source

To construct a master list of opioid medications, we used the Centers for Disease Control and Prevention (CDC) Opioid Data Files, which contain morphine equivalent conversion factors (MECF), the strength per medication unit, and a National Drug Code for non-IV opioid medications based on formulation [13 15]. For methadone, the CDC table provides a morphine equivalency for the lowest dose. However, methadone's morphine equivalency must be adjusted based on the total daily dose: the higher the daily dose, the higher the conversion factor. We developed logic to calculate the daily dose and then applied the appropriate conversion factor. For buprenorphine films, we used a regular expression to extract the strength per unit from the medication name and assigned a morphine equivalency conversion factor of 12.6 based on Centers for Medicare & Medicaid Services (CMS) conversion factors [16].

Medication data for each of the cohorts was extracted from the Clarity database, including the prescription Sig (i.e. the prescription administration instructions), quantity prescribed, units per dose, doses per day, start date of the prescription, and the authorizing provider. To calculate the opioid use prior to the visit, we included all outpatient opioid prescriptions, either discharge medications from an inpatient stay, an emergency department (ED) visit, or any ambulatory setting. We excluded intravenous (IV) medications from our analysis. We also excluded medications that were discontinued within 3 days of ordering, which we assumed had been ordered in error and then cancelled.

Calculating Days' Supply

The days' supply for the opioid prescription was calculated using the formula below:

$$Days' \ Supply = \frac{Quantity \ prescribed}{Maximum \ Units \ per \ day}$$

We used this formula to calculate the number of days for each prescription, which was then used to create the categories of pre-visit opioid use:

1. No known opioid use in 45 days prior to the visit;
2. Intermittent opioid use, or opioid use 45 days or fewer prior to the visit but not on long-term opioids;
3. Long-term opioid use, or 60 or more opioid days in the 90 days prior to the visit) (25).

Appendix 5. Table 4. Adjusted Predicted Probabilities of Contraindications for NSAIDs and Opioids and Receipt of an Opioid at a Primary Care Office Visit for Low Back Pain

	Predicted Probability	Marginal Difference		[95% Confidence Intervals]
Kidney Disease				
None	0.04		0.03	0.05
Diagnosed	0.07	0.03	0.05	0.08
Liver Disease				
None	0.04		0.04	0.05
Diagnosed	0.03	-0.01	0.02	0.05
Cardiovascular or Cerebrovascular Disease				
None	0.04		0.04	0.05
Diagnosed	0.04	-0.01	0.03	0.05
Gastrointestinal Disorder, including GERD, Peptic Ulcers, or Bleeding				
None	0.04		0.04	0.05
Diagnosed	0.03	-0.01	0.03	0.04
Index or Chronic Systemic Steroid Use				
No	0.05		0.04	0.06
Yes	0.03	-0.02	0.02	0.04
Index or Chronic NSAID Use				
No	0.04		0.03	0.05
Yes	0.04	-0.01	0.03	0.05
Index or Chronic Anticoagulant or Antiplatelet Use				
No	0.04		0.03	0.04
Yes	0.05	0.01	0.04	0.06
Depression Disorder				
No	0.04		0.04	0.05
Yes	0.04	0.00	0.03	0.05
Anxiety Disorder				
No	0.04		0.04	0.05
Yes	0.04	-0.01	0.03	0.04
Substance Use Disorder				
No	0.04		0.03	0.05
Yes	0.07	0.02	0.04	0.07
Benzodiazepine Prescribed at Index Visit				
No	0.04		0.03	0.04
Yes	0.11	0.07	0.08	0.14
Age				
Under Age 65	0.04	Reference	0.04	0.05
Age 65 and Older	0.04	-0.01	0.03	0.04
Sex				
Female	0.04	Reference	0.03	0.04
Male	0.05	0.01	0.04	0.05
Hispanic Ethnicity				
Non-Hispanic	0.04	Reference	0.03	0.05
Hispanic	0.05	0.01	0.04	0.06
Unknown/Refused	0.03	-0.01	0.02	0.03
Race	0.04	0.00	0.03	0.05
White	Reference			

Black	0.04	0.00	0.03	0.05
Asian/Pacific Islander	0.04	0.00	0.03	0.05
Other/Unknown	0.05	0.01	0.03	0.06
Marital Status				
Single	0.04	Reference	0.03	0.04
Married, Domestic Partnership, or Significant Other	0.04	0.00	0.03	0.05
Divorced, Legally Separated, or Widowed	0.05	0.02	0.04	0.06
Other/Unknown	0.04	0.01	0.02	0.06
Employment Status				
Full Time, Self-Employed, Part-Time, Full-Time Student	0.04	Reference	0.04	0.05
Retired	0.04	0.00	0.03	0.05
Disabled or Never Worked	0.04	0.00	0.03	0.05
Not Employed, Unknown, or Missing	0.04	-0.01	0.03	0.05
Tobacco User				
Never Smoker	0.04	Reference	0.03	0.04
Ever Smoker, Quit	0.05	0.01	0.04	0.05
Ever Smoker, Current	0.05	0.01	0.03	0.06
Opioid Use Before				
No opioid use 45 days prior	0.03	Reference	0.03	0.04
Intermittent Opioid Use	0.11	0.08	0.09	0.13
Long-Term Opioid Use	0.18	0.15	0.13	0.23

References

1. Compton Iii WM, Cottler LB, Jacobs JL, Ben-Abdallah A, Spitznagel EL. The role of psychiatric disorders in predicting drug dependence treatment outcomes. American Journal of Psychiatry. 2003;160(5):890-5.

2. American Geriatrics Society Panel on the Pharmacological Management of Persistent Pain in Older P. Pharmacological Management of Persistent Pain in Older Persons. Journal of the American Geriatrics Society. 2009;57(8):1331-46.

3. Smith H, Bruckenthal P. Implications of Opioid Analgesia for Medically Complicated Patients. Drugs & Aging. 2010;27(5):417-33.

4. Breckenridge J, Clark JD. Patient characteristics associated with opioid versus nonsteroidal anti-inflammatory drug management of chronic low back pain. The Journal of Pain. 2003;4(6):344-50.

5. Turk DC, Okifuji A. What factors affect physicians' decisions to prescribe opioids for chronic noncancer pain patients? Clin J Pain. 1997;13.

6. Deyo RA, Von Korff M, Duhrkoop D. Opioids for low back pain. BMJ : British Medical Journal. 2015;350.

7. California Office of Statewide Health Planning and Development. CEDARS SINAI MEDICAL CENTER (106190555) Annual Financials - Audited. 2017 June 30, 2017.

8. Raisch DW. A Model of Methods for Influencing Prescribing: Part I. A Review of Prescribing Models, Persuasion Theories, and Administrative and Educational Methods. DICP. 1990;24(4):417-21.

9. Raisch DW. A Model of Methods for Influencing Prescribing: Part II. A Review of Educational Methods, Theories of Human Inference, and Delineation of the Model. DICP. 1990;24(5):537-42.

10. Schumock G, Walton S, Y Park H, Nutescu E, C Blackburn J, M Finley J, et al. Factors that Influence Prescribing Decisions2004. 557-62 p.

11. Hadland SE, Rivera-Aguirre A, Marshall BDL, Cerdá M. Association of Pharmaceutical Industry Marketing of Opioid Products With Mortality From Opioid-Related OverdosesMarketing of Opioid Products and Mortality From Opioid-Related OverdosesMarketing of Opioid Products and Mortality From Opioid-Related Overdoses. JAMA Network Open. 2019;2(1):e186007-e.

12. Hadland SE, Cerdá M, Li Y, Krieger MS, Marshall BDL. Association of pharmaceutical industry marketing of opioid products to physicians with subsequent opioid prescribing. JAMA internal medicine. 2018;178(6):861-3.

13. Burgess DJ, Nelson DB, Gravely AA, Bair MJ, Kerns RD, Higgins DM, et al. Racial Differences in Prescription of Opioid Analgesics for Chronic Noncancer Pain in a National Sample of Veterans. The Journal of Pain. 2014;15(4):447-55.

14. Sullivan MD, Edlund MJ, Fan M-Y, DeVries A, Braden JB, Martin BC. Risks for possible and probable opioid misuse among recipients of chronic opioid therapy in commercial and medicaid insurance plans: The TROUP Study. Pain. 2010;150(2):332-9.

15. Hernández-Díaz S, Rodríguez LAG. Steroids and Risk of Upper Gastrointestinal Complications. American Journal of Epidemiology. 2001;153(11):1089-93.

16. Shorr RI, Ray WA, Daugherty JR, Griffin MR. Concurrent use of nonsteroidal anti-inflammatory drugs and oral anticoagulants places elderly persons at high risk for hemorrhagic peptic ulcer disease. Archives of internal medicine. 1993;153(14):1665-70.

17. Bhatt DL, Scheiman J, Abraham NS, Antman EM, Chan FKL, Furberg CD, et al. ACCF/ACG/AHA 2008 expert consensus document on reducing the gastrointestinal risks of antiplatelet therapy and NSAID use: a report of the American College of Cardiology Foundation Task Force on Clinical Expert Consensus Documents. Journal of the American College of Cardiology. 2008;52(18):1502-17.

18. Navarese EP, Andreotti F, Schulze V, Kołodziejczak M, Buffon A, Brouwer M, et al. Optimal duration of dual antiplatelet therapy after percutaneous coronary intervention with drug eluting stents: meta-analysis of randomised controlled trials. BMJ : British Medical Journal. 2015;350:h1618.

19. Pithadia AB, Jain S. Treatment of inflammatory bowel disease (IBD). Pharmacological Reports. 2011;63(3):629-42.

20. Ridker PM, Goldhaber SZ, Danielson E, Rosenberg Y, Eby CS, Deitcher SR, et al. Long-term, low-intensity warfarin therapy for the prevention of recurrent venous thromboembolism. New England Journal of Medicine. 2003;348(15):1425-34.

21. Blackburn-Munro G, Blackburn-Munro RE. Chronic Pain, Chronic Stress and Depression: Coincidence or Consequence? Journal of Neuroendocrinology. 2001;13(12):1009-23.

22. Kisely S, Lin E, Gilbert C, Smith M, Campbell L-A, Vasiliadis H-M. Use of administrative data for the surveillance of mood and anxiety disorders. Australian & New Zealand Journal of Psychiatry. 2009;43(12):1118-25.

23. Weiss AJ, Barrett ML, Heslin KC, Stocks C. Trends in Emergency Department visits involving mental and substance use disorders, 2006–2013: Statistical Brief #216. 2006.

24. Sun EC, Dixit A, Humphreys K, Darnall BD, Baker LC, Mackey S. Association between concurrent use of prescription opioids and benzodiazepines and overdose: retrospective analysis. BMJ. 2017;356.

25. Centers for Disease Control and Prevention. Quality Improvement and Care Coordination: Implementing the CDC Guideline for Prescribing Opioids for Chronic Pain. Atlanta, GA: National Center for Injury Prevention and Control, Division of Unintentional Injury Prevention; 2018.

26. Park TW, Saitz R, Ganoczy D, Ilgen MA, Bohnert ASB. Benzodiazepine prescribing patterns and deaths from drug overdose among US veterans receiving opioid analgesics: case-cohort study. BMJ : British Medical Journal. 2015;350:h2698.

27. Jones CM, McAninch JK. Emergency department visits and overdose deaths from combined use of opioids and benzodiazepines. American journal of preventive medicine. 2015;49(4):493-501.

28. Passik SD, Kirsh KL. Opioid therapy in patients with a history of substance abuse. CNS Drugs. 2004;18(1):13-25.

29. Boscarino JA, Rukstalis M, Hoffman SN, Han JJ, Erlich PM, Gerhard GS, et al. Risk factors for drug dependence among out-patients on opioid therapy in a large US health-care system. Addiction. 2010;105(10):1776-82.

30. National Committee for Quality Assurance. HEDIS Measures Washington, DC2018 [Available from: http://www.ncqa.org/hedis-quality-measurement/hedis-measures.

31. The National Quality Forum. Measures, Reports & Tools 2019 [Available from: https://www.qualityforum.org/Measures_Reports_Tools.aspx.

32. Clarke H, Soneji N, Ko DT, Yun L, Wijeysundera DN. Rates and risk factors for prolonged opioid use after major surgery: population based cohort study. BMJ. 2014;348:g1251.

33. Daubresse M, Chang HY, Yu Y, Viswanathan S, Shah ND, Stafford RS, et al. Ambulatory diagnosis and treatment of nonmalignant pain in the United States, 2000-2010. Med Care. 2013;51(10):870-8.

34. Dobscha SK, Morasco BJ, Duckart JP, Macey T, Deyo RA. Correlates of prescription opioid initiation and long-term opioid use in veterans with persistent pain. Clin J Pain. 2013;29(2):102-8.

35. Svendsen K, Fredheim OM, Romundstad P, Borchgrevink PC, Skurtveit S. Persistent opioid use and socio-economic factors: a population-based study in Norway. Acta anaesthesiologica Scandinavica. 2014;58(4):437-45.

DISCUSSION

The three studies in this dissertation aimed to capture various decision-making challenges faced by clinicians prescribing opioids in outpatient settings in the midst of an important public health crisis. Opioid-related overdoses continue to rise, and although many are now driven by illicit fentanyl and other drugs, prescription opioid overdoses continue to be a major public health challenge (3). Against this backdrop of opioid overdoses and stricter regulations around opioid prescribing, clinicians must continue to form and maintain relationships with their patients and effectively treat and manage patients' painful conditions. In this dissertation, I focused on three decision-making points faced by clinicians who prescribe opioids: how to assess whether patients are misusing or abusing opioids, whether to assume a new patient's existing opioid prescription, and how to balance prescribing opioids for patients who may have few options for pain control given other medical conditions or concurrent prescriptions.

In the first study, I examined how clinicians are contending with whether and how to implement four opioid risk mitigation strategies in their clinical practices. For certain clinicians, particularly those focused on episodic care, we found that the strategies helped clinicians set limits with patients and document misuse or abuse using objective evidence. Organizational policies and protocols not only made use of the strategies seamless, it also gave clinicians the ability to blame an outside entity – "the government" or "our center" – for their use, thus depersonalizing the use of these potentially disruptive strategies. Other clinicians, specifically clinicians for whom developing long-term, trusting relationships is important, found the strategies disruptive to their relationships and unfair to patients. These findings demonstrate that policies should consider the nature of the patient-clinician relationship when creating and implementing strategies to reduce opioid misuse or abuse. Strategies tailored to different settings or implementation approaches that take these relationships into account may be more successful.

In the second study, I analyzed how clinicians make decisions about refilling and managing a new patient's existing opioid prescriptions. Using a sample of clinicians affiliated with a tertiary care medical center, I found that clinicians took three different approaches to assuming a new patient's opioid prescriptions. Clinicians in the Staunch Opposers group were highly averse to assuming new patients' existing opioid prescriptions. These clinicians perceived opioids as inappropriate for chronic pain and used pre-screening approaches to avoid seeing patients who might be asking for the continuation of their opioid prescriptions. Clinicians in the Cautious and Conflicted group were apprehensive about assuming a new patient's opioid prescriptions and generally only agreed if they deemed the patient to be trustworthy. These clinicians also only continued the opioid prescription if the opioid medication fell within their comfort zone with regards to daily dose and type of opioid. Clinicians in these first two groups often felt resentful that other clinicians "dumped" patients with existing opioid prescriptions on them. Finally, clinicians in the Rapport Builders group worked to establish trusting relationships with patients before collaborating with patients to taper down prescriptions. Findings from this study touch on the marginalization of patients taking opioids or developing substance use disorder. As opioid prescribing becomes increasingly scrutinized, many clinicians may feel uncomfortable with prescribing opioids and continuing prescriptions they did not start, particularly if the prescriptions are for higher doses or higher potency medications. As this study found, and others have noted (7-9), this apprehension could lead clinicians to stop prescribing opioids or avoid assuming prescriptions for patients on existing long-term opioid therapy, with concerning consequences for patients.

In the last paper, I sampled primary care visits for low back pain from 2013-2017 within one health system and examined whether individuals were prescribed an opioid during this visit based on having comorbidities or concurrent prescriptions known to be contraindications for NSAIDs or relative contraindications to opioids. After controlling for previous opioid use, I found that patients

with kidney disease, a significant contraindication for NSAIDs, had higher odds of receiving an opioid prescription. This finding indicates potentially appropriate opioid prescribing. However, I also found that patients with a history of substance use or a concurrent benzodiazepine prescription had higher odds of receiving an opioid prescription compared to individuals without either. These findings indicate that clinicians may be writing potentially inappropriate opioid prescriptions, placing patients at higher risk for overdose or addiction.

Barriers to improving opioid prescribing

The decision-making processes examined in these studies are complex and how clinicians approach each decision-making point can have significant consequences for patients. For example, if clinicians perceive that using the risk strategies is too onerous and decide not to prescribe any opioids, patients with existing opioid prescriptions or with few analgesic alternatives due to comorbidities may have a difficult time accessing high-quality care. On the other hand, if clinicians ignore the use of all risk mitigation strategies and prescribe opioids to patients with a previous history of substance use, they may place patients at higher risk for developing opioid use disorder. However, thoughtful, complex decision-making takes time and resources. As the authors of the 2016 CDC guidelines note in a 2019 commentary reflecting on the guidelines, "there are no shortcuts to safer opioid prescribing" (8). The three studies in this dissertation demonstrate that there are two significant barriers to improving care for individuals who are prescribed opioids: internalized stigma among providers towards patients on long-term opioid therapy or who have developed substance use and a lack of incentives within the health system to manage opioid prescriptions safely and appropriately.

Findings from the two qualitative studies illustrate that many clinicians are uncomfortable with patients exhibiting potential first signs of substance use disorder, and in the third study, I found that patients with a history of substance use disorder had a higher probability of receiving an opioid

than those without such a history. In the first study, Non-adopters of risk mitigation strategies such as urine drug testing and the opioid contract reported that rather than using these strategies with patients whom they felt misused opioids – often a sign of potential incipient substance use disorder – they referred the patient out to another provider. In the second study, two groups of clinicians, the Staunch Opposers and the Cautious and Conflicted Clinicians, were apprehensive about or outright averse to assuming a new patient's opioid prescriptions. While in many cases this may reflect discomfort with continuing the previous therapy, providers may also be uneasy about managing prescriptions for patients who may have undiagnosed substance use disorders. These findings reflect other studies which have found that many clinicians are wary of managing patients with potential or diagnosed substance use disorders (10, 11). Clinicians report having little training on substance use disorder management and find it difficult to discuss drug use with patients (12). Additionally, many clinicians may not yet accept the biopsychosocial model of addiction, which sees addiction as a biological disease rather than a moral or social failing (11). Increasing substance use training in medical schools and in continuing education programs may decrease stigma and increase clinicians' self-efficacy with regards to treating patients with substance use disorders.

Another important barrier to safe and appropriate opioid prescribing is the lack of incentives for this type of care in the current health care system. Conversations with patients about safe opioid use may require longer visits. Making decisions about whether to prescribe opioids may require complex decision-making about a patient's comorbidities and risk factors, which may necessitate difficult discussions about prior and current substance use. Using risk mitigation strategies such as the state databases on controlled substances or urine drug testing may unearth findings that demand thoughtful conversations about addiction treatment. All of these conversations take time, and in a system that prioritizes efficiency and short visits, it may be difficult for clinicians and patients to broach these difficult topics.

Building on the Model of Methods for Influencing Prescribing

Findings from this dissertation advance the science on decision-making around prescribing by identifying important factors and processes associated with prescribing not previously described in the literature. Previous reviews of factors and models associated with prescribing include one developed by Raisch, who developed a Model of Methods for Influencing Prescribing (MMIP) (13, 14). Raisch reviewed four sources of literature to identify factors that influence prescribing, including: (1) theoretical models of prescribing, (2) theories of persuasion, (3) the literature around interventions (educational and policy-related) aimed at improving prescribing, and (4) theories about decision-making (13, 14). Factors posited to influence prescribing in the MMIP include patient characteristics (symptoms, diagnoses, and psychosocial factors); clinician characteristics (race, gender, socioeconomic class, and training); and organizational factors (prescribing restrictions, protocols, financial incentives, and formularies). The MMIP also theorizes that clinicians' prescribing intentions are formed by internal decision-making processes that incorporate attitudes towards the drugs, subjective norms about prescribing and biases including heuristics (cognitive shortcuts) that can make prescribing more pragmatic but potentially less optimal. Heuristics, developed in the psychology literature (15), include representativeness, availability, framing, and anchoring heuristics. For instance, a representative heuristic involves making decisions based on the perceived similarity of certain events; an availability heuristic involves making decisions based on vivid or recent experiences; and an anchoring heuristic explains how individuals are highly influenced by initial judgements or decisions (16, 17). The internal decision-making process is also shaped by a variety of external influential factors such as advertisements, pharmaceutical representative visits, continuing education, and colleagues. Finally, the MMIP includes a construct around how feedback about previous therapy can shape perceptions about the diagnosis and prescribing decisions.

In this dissertation, I found several ways in which decision-making around prescribing of opioids corresponds to existing constructs within the MMIP. In Study 1, adopters of the risk mitigation strategies discussed organizational protocols, legislative policies, and the CDC guidelines with patients. These findings map onto the upstream organizational factors described in the MMIP. In Study 2, I found that clinicians mentioned subjective norms around prescribing set by colleagues and administrators; e.g., describing clinicians in one clinic as being all "no opioid" or "low opioid" prescribers. These subjective norms, described in the MMIP, play a role in the internal decision-making process and have also been found by others to be influential in prescribing decisions (18). I also found that heuristics are often used by clinicians when making decisions around prescribing. In Study 1, when making decisions about whether and when to use the risk mitigation strategies, we found that clinicians' vivid experiences about patients becoming upset when the opioid contract was introduced influenced non-adoption of this strategy. In Study 2, when making decisions about whether to take on new patients on existing opioid prescriptions, clinicians whom we identified as Staunch Opposers often described patients on chronic opioid therapy in a negative light, using descriptors such as "drug addicts," even when some patients may have been on these medications appropriately, as indicated by the findings of Study 3. Making generalized judgements about patients based on little information is an example of the representativeness heuristic. In Study 2, clinicians described relying on markers of trustworthiness, such as accepting new patients only from trusted referring clinicians, also an example of the use of heuristics. These findings illustrate that the MMIP effectively captures different constructs associated with decision-making for prescribing opioids.

However, I also found ways in which the findings from this dissertation expand and extend the MMIP. I identified several new constructs that may influence prescribing, including (1) the nature of the patient-clinician relationship, (2) the management of risks to both the patient and clinician, (3) ethical considerations, and (4) perceptions relating to the prescriber's identity and role

as a clinician. Additionally, while the MMIP is useful for conceptualizing a single prescribing episode, decision-making around prescribing has become increasingly complex given the rise in prevalence of chronic diseases and the corresponding long-term pharmacological therapies to manage these conditions. Clinicians often make recurring prescribing decisions over time while working within our fragmented healthcare system; (5) I consider this longitudinal perspective in an expansion of the model.

Based on findings from this dissertation and other studies, I argue that the *nature of the patient-clinician relationship* significantly influences prescribing decisions and thus is an important construct that should be added to the MMIP. In Study 1, I found that in settings where clinicians often developed long-term relationships with patients, such as primary care or rheumatology clinics, clinicians were much less likely to adopt the risk mitigation strategies when prescribing opioids. These providers expressed that their existing knowledge of their patients made use of the strategies unnecessary, uncomfortable, and disruptive to the patient-clinician relationship. In Study 2, I also found that willingness to take on patients already on chronic opioid medications was reliant on trust-building in order to transition patients to safer doses of opioids. Maintaining a trusting patient-clinician relationship has been identified as one of the most important factors driving general prescribing decision-making (19, 20) further underscoring the importance of adding this to the MMIP. Similar to findings in Study 1, one qualitative study found that patients who were well-known to the physician were afforded more flexibility when requesting medications and were more likely to be granted controlled prescriptions without an in-person visit (21). The nature of the patient-clinician relationship likely influences the internal decision-making process described by the MMIP, and future research should expand on how the nature of these relationships influence appropriate or inappropriate prescribing decisions.

Managing various types of *risks* was also an important consideration: when prescribing medication (particularly those with high risk of abuse or misuse) clinicians consider potential risks to the patient, identify strategies to assess risks, select which strategies to use, interpret and act on the information, and then make appropriate decisions around prescribing. In Study 1, I identified how clinicians who adopted and did not adopt the various risk mitigation strategies assessed risk of abuse or misuse. For example, clinicians who did not adopt the risk mitigation strategies still found ways to assess a patient's risk for misuse such as requesting previous records or looking for suspicious behaviors. Clinicians must also think about risks of adverse effects and drug-drug interactions. In Study 3, I found that clinicians balanced risks of existing comorbidities and concurrent prescriptions when making prescribing decisions: individuals who were unable to tolerate non-opioid alternatives due to kidney disease or concurrent anticoagulants or antiplatelet medication use were more likely to receive an opioid prescription at a visit for low back pain. However, I also found that patients with a history of substance use disorder or concurrently receiving a benzodiazepine were also much more likely to receive an opioid prescription, placing these patients at greater risk for opioid use disorder or overdose. These findings suggest that clinicians may be more likely to act on certain risks over others. Future research should seek to elucidate how clinicians balance various types of risks. Clinicians must also consider professional risks to themselves, such as potentially prescribing to an individual who is diverting medications or prescribing to an individual who may experience a fatal overdose from medications. In either case, clinicians could face serious professional sanctions or lose their license to practice as has been seen in recent years (22, 23). Coverage of these arrests and of the overall opioid epidemic have resulted in clinicians feeling anxious about risks to their professional livelihoods. In Study 2, I found that many clinicians were conflicted and cautious about prescribing opioids, and several expressed that they either didn't prescribe any opioids or were planning on not prescribing opioids in the future. These decisions likely reflect a desire to reduce

professional risks associated with certain prescribing scenarios, such as prescribing high-dose or high-potency opioids. Thus, findings from these studies argue for including constructs related to risk management in the MMIP.

Clinicians also reflected on *ethical considerations* when making decisions about prescribing and adopting the use of risk mitigation strategies. In Study 1, I found that clinicians considered perceptions of whether the strategies benefitted the patient, invoking the ethical principle of beneficence. Clinicians also considered fairness, bearing in mind whether the strategies treated patients equally, and autonomy, reflecting on whether the strategies shifted too much power to the physician. In Study 2, providers in the Rapport Builders group also expressed ethical considerations, noting that it would be unethical to refuse refills to new patient on existing opioid medications because the patient could end up with an unscrupulous provider who didn't manage opioids properly. Given these findings, including ethical considerations in the MMIP more closely models real-world prescribing.

Findings from this dissertation also touch upon how clinicians may see themselves in their *professional roles*. One study found that clinicians tend to identify primarily with one role: a healer, a businessperson, a researcher, a clinical expert, or a teacher. These self-identified roles may influence prescribing behavior (24). In Study 2 for example, we found that some clinicians saw themselves as clinical experts and preferred to provide tertiary care exclusively, while others prided themselves on developing continuous, long-term care to patients. These self-defined roles influenced prescribing, as clinicians who defined themselves as clinical experts did not want to assume a patient's chronic opioid prescriptions, while those who valued longitudinal care were more open to managing long-term prescriptions. Other studies have found similar findings, noting that prescribing behavior is often driven by provider characteristics and self-identity. In one qualitative study focused on general prescribing in the primary care setting, clinicians were divided into high, medium, and low-cost

prescribers based on their prescribing behaviors. High-cost prescribers tended to be driven by "an aggressive desire to find out what the patient's problem was and to 'fix' it" (25). High-cost prescribers also tended to see the medical visit as a business transaction and had a more difficult time saying no to patients. In contrast, low-cost prescribers tended not to view pharmaceuticals as the answer for all health problems. More research is needed to understand how clinicians self-identify and how these self-identified roles may lead clinicians to adopt different prescribing and treatment approaches.

Originally developed in 1990, the MMIP may be limited in its current applicability given the nature of how chronic diseases are managed today and how the healthcare system has evolved. Approximately 40% of Americans now manage multiple chronic conditions (26). These individuals often see multiple clinicians for treatment including many specialists (27); and are prescribed many medications, increasing the risk of drug-drug interactions and adverse effects (28). Thus, prescribing decisions today may involve piecing together a patient's complex medical history of various diagnoses, prescriptions, procedures, imaging tests, and laboratory results from different clinicians over multiple visits. The fragmentation of the healthcare system further increases the complexity of this decision-making process, as the information may not be easily accessible from the electronic health care record given the lack of connectivity between different systems.

I therefore argue for an expansion of the MMIP that considers how a clinician and patient may have *recurring interactions* over time and interactions with multiple clinicians of different specialties. As a result of these two factors, clinicians face frequently changing prescribing decisions. For example, for patients with chronic conditions such as chronic pain, prescribing decisions may change based on a patient's evolving comorbidities, concurrent prescriptions, and risks for misuse or abuse. As patients age, risk-benefit calculations may shift as age is a risk factor associated with opioid misuse and abuse: younger individuals are at highest risk for misuse or abuse of opioids and the risk

of abuse or misuse decreases considerably with increasing age (29). Furthermore, aging patients may develop other types of conditions contraindicated with non-opioid analgesics, such as kidney, cardiovascular, gastrointestinal, cerebrovascular and other diseases, and thus opioids may become more attractive options, as I found in Study 3. An expanded MMIP that incorporates the evolving decision-making process over repeated interactions would more closely capture prescribing decisions in our current health care environment.

Findings from Study 2 also highlight another important element missing in the MMIP: *interactions with multiple clinicians within a system*. Patients may have prescriptions from specialists or surgeons and may then be referred back to their primary care physician – or the reverse. An inpatient visit may also shift a patient's medications: it is well documented that when patients are admitted to the hospital, their medications may change considerably and new medications may be added, further increasing potentially dangerous polypharmacy (30, 31). When clinicians see patients, they must assess the patient's history and current prescriptions through careful medication reconciliation (32), determine the appropriateness of the current regimen, and decide whether to continue the current medication regimen or change it. As I describe in Study 2, many clinicians may be uncomfortable or averse to assuming a new patient's existing medications if they perceive that the regimen is inappropriate or if they are generally unwilling to prescribe certain types of chronic medications (such as controlled substances). If clinicians determine that a prescription is inappropriate, they may have to discuss tapering down with the patient, an often time-consuming and challenging process. Thus, considering patients' prescriptions from and interactions with previous prescribers is an important expansion of the MMIP.

In sum, I argue that the MMIP should be expanded to include new constructs (nature of the patient-clinician relationship, risk management, ethical considerations, and professional roles), and to consider two important processes not currently captured within the model: how clinicians make

prescribing decisions over time given patients' evolving risks and benefits, and interactions with other prescribers in the system. Including these types of interactions with other prescribers in the system more realistically captures decisions clinicians must face when making prescribing decisions for new or established patients. An expanded MMIP could help guide interventions aimed at reducing polypharmacy and improving the appropriateness of prescribing. In the case of opioid prescribing, understanding where and when a patient's high-dose regimen starts can help identify and target areas for improvement.

Conclusion

The studies in this dissertation shed light on three aspects of decision-making with respect to opioid prescribing, but further research is needed on this critically important public health topic. There is little known about patients who have experienced abrupt discontinuation of their opioid prescriptions due to clinician choices. Further research is also needed in understanding the effectiveness and unintended consequences of new legislation around opioid prescribing, including prescription duration limits and policies requiring that clinicians prescribe naloxone to individuals on long-term opioid therapy. Given the urgency with which these policies were developed, they may have significant shortcomings that should be assessed in order to determine whether patients are being harmed during their implementation.

Given the current public health crisis, clinicians face many complex decisions when prescribing opioids in order to maximize safety while treating pain. These complex, nuanced decisions likely necessitate several ongoing conversations with patients to discuss an individual's risk and benefit profile with regards to prescription opioids. Reducing the stigma associated with discussion and treatment of substance use is likely to improve these conversations for both clinicians and their patients. Ensuring that clinicians have adequate training and incentives to manage opioid prescribing appropriately will also likely improve quality of care.

REFERENCES

1. Zhu W, Chernew ME, Sherry TB, Maestas N. Initial Opioid Prescriptions among U.S. Commercially Insured Patients, 2012–2017. New England Journal of Medicine. 2019;380(11):1043-52.

2. Centers for Disease Control and Prevention. Annual surveillance report of drug-related risks and outcomes - United States. Centers for Disease Control and Prevention; 2018 August 31, 2018.

3. Scholl L, Seth P, Kariisa M, Wilson N, Baldwin G. Drug and opioid-involved overdose deaths—United States, 2013–2017. Morbidity and Mortality Weekly Report. 2019;67(5152):1419.

4. Jones CM. Heroin use and heroin use risk behaviors among nonmedical users of prescription opioid pain relievers – United States, 2002–2004 and 2008–2010. Drug and Alcohol Dependence. 2013;132(1):95-100.

5. Centers for Disease Control and Prevention. Guideline for Prescribing Opioids for Chronic Pain: Centers for Disease Control and Prevention; 2016 [updated January 6, 2017. Available from: https://www.cdc.gov/drugoverdose/prescribing/guideline.html.

6. National Conference of State Legislatures. Prescribing policies: States confront opioid overdose epidemic Washington, D.C.2018 [updated April 4, 2018. Available from: http://www.ncsl.org/research/health/prescribing-policies-states-confront-opioid-overdose-epidemic.aspx.

7. Kroenke K, Alford DP, Argoff C, Canlas B, Covington E, Frank JW, et al. Challenges with Implementing the Centers for Disease Control and Prevention Opioid Guideline: A Consensus Panel Report. Pain Medicine. 2019.

8. Dowell D, Haegerich T, Chou R. No Shortcuts to Safer Opioid Prescribing. New England Journal of Medicine. 2019.

9. Wilbers LE. She Has a Pain Problem, Not a Pill Problem: Chronic Pain Management, Stigma, and the Family—An Autoethnography. Humanity & Society. 2014;39(1):86-111.

10. DeFlavio JR, Rolin SA, Nordstrom BR, Kazal LA, Jr. Analysis of barriers to adoption of buprenorphine maintenance therapy by family physicians. Rural Remote Health. 2015;15:3019.

11. Miller NS, Sheppard LM, Colenda CC, Magen J. Why physicians are unprepared to treat patients who have alcohol- and drug-related disorders. Acad Med. 2001;76(5):410-8.

12. Johnson TP, Booth AL, Johnson P. Physician beliefs about substance misuse and its treatment: findings from a U.S. survey of primary care practitioners. Subst Use Misuse. 2005;40(8):1071-84.

13. Raisch DW. A Model of Methods for Influencing Prescribing: Part II. A Review of Educational Methods, Theories of Human Inference, and Delineation of the Model. DICP. 1990;24(5):537-42.

14. Raisch DW. A Model of Methods for Influencing Prescribing: Part I. A Review of Prescribing Models, Persuasion Theories, and Administrative and Educational Methods. DICP. 1990;24(4):417-21.

15. Tversky A, Kahneman D. Judgment under Uncertainty: Heuristics and Biases. Science (New York, NY). 1974;185(4157):1124-31.

16. Brehaut JC, Poses R, Shojania KG, Lott A, Man-Son-Hing M, Bassin E, et al. Do physician outcome judgments and judgment biases contribute to inappropriate use of treatments? Study protocol. Implementation Science. 2007;2(1):18.

17. Steinke DT, MacDonald TM, Davey PG. The doctor-patient relationship and prescribing patterns. Pharmacoeconomics. 1999;16(6):599-603.

18. Lambert BL, Salmon JW, Stubbings J, Gilomen-Stūdy G, Valuck RJ, Kezlarian K. Factors associated with antibiotic prescribing in a managed care setting: An exploratory investigation. Social Science & Medicine. 1997;45(12):1767-79.

19. Bradley CP. Uncomfortable prescribing decisions: a critical incident study. Bmj. 1992;304(6822):294-6.

20. McCrorie C, Closs SJ, House A, Petty D, Ziegler L, Glidewell L, et al. Understanding long-term opioid prescribing for non-cancer pain in primary care: a qualitative study. BMC Fam Pract. 2015;16:121.

21. Bjørner T, Lærum E. Factors associated with high prescribing of benzodiazepines and minor opiates. Scandinavian journal of primary health care. 2003;21(2):115-20.

22. U.S. Department of Justice. O.C. Doctor Arrested on Federal Narcotics Charges that Allege Prescriptions to 'Patients' who Suffered Fatal Overdoses 2018 [updated December 18, 2018. Available from: https://www.justice.gov/usao-cdca/pr/oc-doctor-arrested-federal-narcotics-charges-allege-prescriptions-patients-who-suffered.

23. Nedelman M. Doctors increasingly face charges for patient overdoses. CNN. 2017 July 31, 2017.

24. Shanafelt TD. Enhancing meaning in work: a prescription for preventing physician burnout and promoting patient-centered care. Jama. 2009;302(12):1338-40.

25. Jaye C, Tilyard M. A qualitative comparative investigation of variation in general practitioners' prescribing patterns. The British journal of general practice : the journal of the Royal College of General Practitioners. 2002;52(478):381-6.

26. Buttorff C, Ruder T, Bauman M. Multiple chronic conditions in the United States: RAND Santa Monica, CA; 2017.

27. Hollingsworth JM, Saint S, Hayward RA, Rogers MAM, Zhang L, Miller DC. Specialty Care and the Patient-Centered Medical Home. Medical Care. 2011;49(1):4-9.

28. Shah BM, Hajjar ER. Polypharmacy, Adverse Drug Reactions, and Geriatric Syndromes. Clinics in Geriatric Medicine. 2012;28(2):173-86.

29. Edlund MJ, Martin BC, Fan M-Y, Devries A, Braden JB, Sullivan MD. Risks for opioid abuse and dependence among recipients of chronic opioid therapy: Results from the TROUP Study. Drug and Alcohol Dependence. 2010;112(1):90-8.

30. Trumic E, Pranjic N, Begic L, Bečić F. Prevalence of polypharmacy and drug interaction among hospitalized patients: opportunities and responsabilities in pharmaceutical care. Materia socio-medica. 2012;24(2):68.

31. Doan J, Zakrzewski-Jakubiak H, Roy J, Turgeon J, Tannenbaum C. Prevalence and risk of potential cytochrome p450–mediated drug-drug interactions in older hospitalized patients with polypharmacy. Annals of Pharmacotherapy. 2013;47(3):324-32.

32. Pronovost P, Weast B, Schwarz M, Wyskiel RM, Prow D, Milanovich SN, et al. Medication reconciliation: a practical tool to reduce the risk of medication errors. Journal of critical care. 2003;18(4):201-5.