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Development of the Chronic Pain Coding System (CPCS) for Characterizing Patient-Clinician Discussions About Chronic Pain and Opioids

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Abstract

Objective. To describe the development and initial application of the Chronic Pain Coding System.

Design. Secondary analysis of data from a randomized clinical trial.

Setting. Six primary care clinics in northern California.

Subjects. Forty-five primary care visits involving 33 clinicians and 45 patients on opioids for chronic noncancer pain.

Methods. The authors developed a structured coding system to accurately and objectively characterize discussions about pain and opioids. Two coders applied the final system to visit transcripts. Intercoder agreement for major coding categories was moderate to substantial (kappa = 0.5–0.7). Mixed effects regression was used to test six hypotheses to assess preliminary construct validity.

Results. Greater baseline pain interference was associated with longer pain discussions ($P = 0.007$) and more patient requests for clinician action ($P = 0.02$) but not more frequent negative patient evaluations of pain ($P = 0.15$). Greater clinician-reported visit difficulty was associated with more frequent disagreements with clinician recommendations ($P = 0.003$) and longer discussions of opioid risks ($P = 0.049$) but not more frequent requests for clinician action ($P = 0.11$). Rates of agreement versus disagreement with patient requests and clinician recommendations were similar for opioid-related and non-opioid–related utterances.

Conclusions. This coding system appears to be a reliable and valid tool for characterizing patient-clinician communication about opioids and chronic pain during clinic visits. Objective data on how patients and clinicians discuss chronic pain and opioids are necessary to identify communication patterns and strategies for improving the quality and productivity of discussions about chronic pain

that may lead to more effective pain management and reduce inappropriate opioid prescribing.

Key Words. Communication; Chronic Pain; Opioid Analgesics; Research Methodology; Negotiating; Primary Care

Introduction

Pain is among the most common reasons that patients seek medical attention [1,2], so medical clinic visits often include discussions about pain [3,4]. This is especially true for primary care visits, where the majority of pain management takes place [5,6]. Both patients and clinicians report that discussions about pain management, particularly management of chronic noncancer pain, are often frustrating and unproductive [7–9]. Frustration during discussions about chronic pain management usually stems from disagreements about pain etiology, treatment goals, or the use of opioid analgesics [10,11]. Patients and clinicians both cite poor communication about chronic pain and opioids as a major contributor both to "difficult" visits (i.e., visits that engender clinician frustration and negative countertransference [12]) and to disagreements about pain treatment plans [7,10,11]. Communication about chronic pain has also been shown to influence opioid prescribing decisions [13,14]. In addition, communication plays an important role in establishing effective therapeutic relationships, which are a key component of effective chronic pain management [15,16]. Therefore, improving communication about chronic pain is important for promoting better pain management and reducing inappropriate opioid prescribing.

Surprisingly little is known about how patients and clinicians discuss pain and opioids during clinic visits. A few qualitative studies have analyzed patient-clinician communication about pain in primary care [16–18], specialty[19–21], and inpatient [22] settings, and by doing so have identified important issues that emerge during discussions about pain. However, systematic observation and coding of communication about pain is necessary to measure the frequency of specific behaviors and communication patterns and to better understand how communication relates to postvisit perceptions and health outcomes. These steps, in turn, are needed to develop empirical evidence about what constitutes effective (and ineffective) strategies for communicating about chronic pain. The few prior studies that have systematically analyzed communication about pain were either narrowly focused on specific aspects of communication, such as relational control [23] and nonverbal communication [24,25], or analyzed general communication behaviors rather than behaviors or topics specific to pain [26,27]. No existing schemes for coding patient-clinician interactions capture the specific topical information (especially information about opioids) needed to understand—and ultimately improve—communication about chronic pain.

In this article, we describe development and initial application of the Chronic Pain Coding System (CPCS), which is designed to meet this need by objectively and reliably characterizing patient-clinician communication about pain and opioids during clinic visits. Development of the CPCS is an important step toward eventually allowing researchers to use data from direct observation to identify how and why pain-related discussions break down or succeed and to test associations between communication and health outcomes. Insights gained from application of the CPCS may facilitate development of communication strategies to minimize high-risk opioid prescribing while maintaining the therapeutic relationship, leading to fewer difficult encounters, greater patient agreement about chronic pain management, and potentially more appropriate, thus safer, opioid prescribing.

Methods

Data Sources

Data were from a randomized clinical trial comparing the effects of three strategies (an interactive multimedia computer program, an educational video, and usual care) on discussion of depressive symptoms during primary care visits by patients with and without depression [28]. We used data from primary care visits because that is where the majority of chronic pain management and opioid prescribing takes place [5,6]. Primary care clinicians and adult patients were recruited from six clinics in northern California in 2010 and 2011. Patients received the study intervention (or control) immediately before their appointment. Those who did not speak English or who were taking medications for depression were ineligible.

Clinicians and patients were asked to provide consent to audio record their study visits. When both the clinician and patient agreed, patients were given a digital audio recorder and shown how to record their visit. Clinicians were informed when a visit was being recorded. Recordings were professionally transcribed for analysis. Full details of the parent study, which was approved by the institutional review boards of all participating institutions, have been previously published [28,29].

Patients' baseline questionnaires included demographics and the 12-item Short Form Health Survey [30] (SF-12). The SF-12 is a widely used health status measure that includes one item asking patients to rate how much pain interferes with their normal activities on a 5-point Likert scale (1 = not at all; 5 = extremely). Patients' postvisit questionnaires included a question asking if they requested a pain medication prescription.

Clinicians' postvisit questionnaires included one item asking if they prescribed or continued an opioid analgesic during that visit and three items rating visit difficulty (amount of time required, amount of effort required, and the degree to which the clinician found

the visit difficult) on 3-point scales (less than average, about average, greater than average).

Sample Selection

To identify transcripts involving patients on opioids for chronic pain, we first identified transcripts that met ≥ 1 of the following criteria: a) the clinician reported prescribing or continuing an opioid analgesic, b) the patient reported requesting a pain medication prescription, c) a computerized search of the transcript text identified mention of an opioid medication. The full search string is shown in Figure 1. One author (SGH) reviewed all transcripts that met one of these criteria to identify transcripts that involved patients on long-term opioid therapy. This was defined as taking ≥ 1 opioid pill per day for at least 90 days to treat noncancer pain. Another author (RLK) independently reviewed all transcripts for which eligibility was unclear; disagreements were resolved by discussion. Transcripts in the final sample were used for coding system development.

Coding System Development

The CPCS is based on the principles of interaction analysis [31,32], a method that uses data from direct observation to systematically categorize and analyze interpersonal interactions. We followed the approach recommended by Street of first identifying outcomes of interest and then identifying and measuring communication behaviors hypothesized to affect those outcomes [33]. Our outcomes of interest were patient agreement with treatment plan, clinician-reported visit difficulty, and changes in opioid dosing. We chose these outcomes because they are likely to be influenced by patient-clinician communication and have been associated with long-term patient outcomes [34]. Clinician-reported visit difficulty is associated with worsening of patient symptoms, higher health care utilization, and decreased patient satisfaction [12,35]. Increases in opioid doses are associated with increased risk of opioid-related overdose [36].

We compiled lists of communication patterns and constructs likely to be associated with these outcomes by drawing on clinical experience, existing research, and previously published coding systems for characterizing

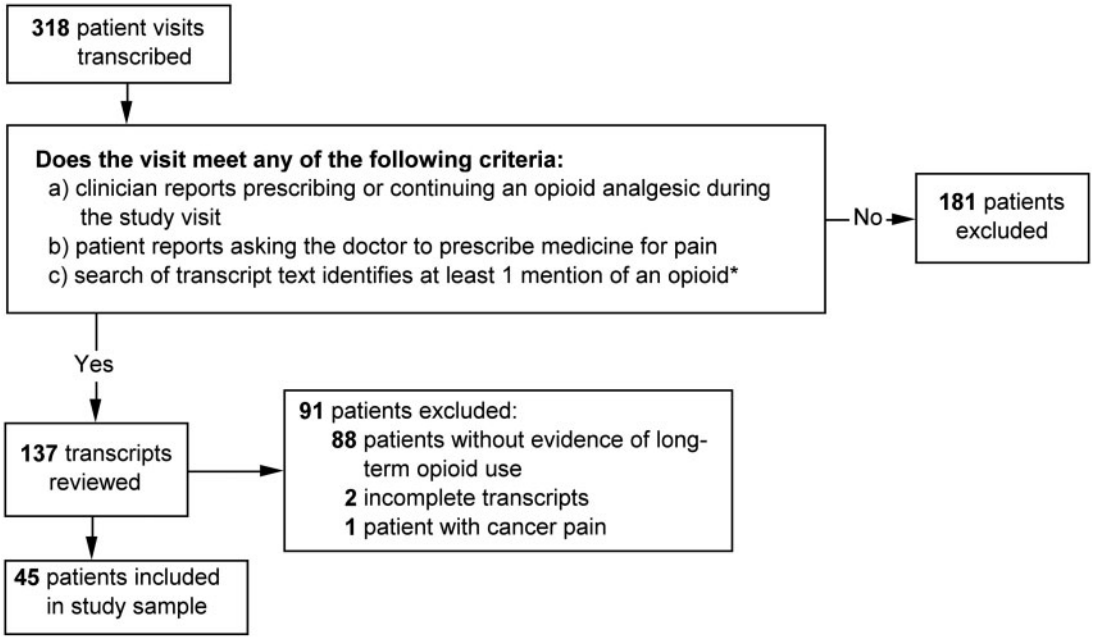

Figure 1 Sample selection.
*Computer-aided text search for mention of opioids comprised the following terms: (Codeine OR Fentanyl OR Duragesic OR Actiq OR Sublimaze OR Hydromorphone OR Dilaudid OR Contin OR Levorphanol OR Meperidine OR Demerol OR Pethidine OR Methadone OR Dolophine OR Methadose OR Metadol OR Morphine OR "MS contin" OR MSContin OR Kadian OR Avinza OR Roxanol OR Oramorph OR MSIR OR MSSR OR Depodur OR Statex OR "M-eslon" OR MOS OR Doloral OR Oxycodone OR Roxicodone OR Oxycontin OR Percolone OR Oxylr OR Oyxfast OR Endocodone OR Supeudol OR Oxymorphone OR Opana OR Numorphan OR Propoxyphene OR Darvon OR Pulvules OR Anexsia OR Combunox OR Darvocet OR Fioricet OR Fiorinal OR Lorcet OR Lortab OR Maxidone OR Mersyndol OR Norco OR Percocet OR Percodan OR Propacet OR Roxicet OR Soma OR Synalgos OR Dihidrocodeine OR Talacen OR Tylox OR Vicodin OR Vicoprofen OR Wygesic OR Zydone)

patient-clinician interaction [37–41]. One key construct was patient-centered communication, which is generally considered critical for effective patient-clinician communication[42,43]. Another important construct was the presence of negotiation between patients and clinicians (operationalized as patient requests and clinician recommendations). Negotiation around diagnosis and treatment has been linked to clinician-reported visit difficulty [39,44] and is important in communication about other commonly contested medical problems [45,46]. Other communication patterns that we considered likely to be associated with the outcomes of interest included patient assessments of their physical pain and assessments of pain treatment options. Finally, given the central role of opioids in discussions of and disagreements related to chronic pain, we included several opioid-specific communication topics, such as discussion of opioid-related side effects and opioid dose changes.

Once we compiled our list of important communication patterns and constructs, we organized them into utterance-level categories for coding purposes. An utterance is a segment of speech by one person that expresses a complete thought; coding systems that characterize patient-clinician interactions often use utterance as the unit of analysis because a single speaking turn can comprise several different thoughts. Four authors applied the initial coding system to two transcripts and then met to discuss results. Categories were modified to clarify ambiguities, increase reliability, and accommodate new patterns in the data. This process was repeated several times until the categories could be applied reliably.

The CPCS was designed to characterize pain-related utterances. The median primary care visit covers six different topics in 15 minutes [47], suggesting that visits focused on pain management are likely to include discussion of topics not relevant to chronic pain. Building on our prior work [4], utterances were defined as pain-related if they discussed ongoing physical pain (excluding cardiac chest pain). The CPCS does not distinguish between acute and chronic pain. In our experience this distinction cannot be made reliably from recorded visits and is not always clinically relevant for patients on long-term opioids. Discussion of nonpain health conditions (e.g., insomnia, depression) were considered pain-related only when the patient or clinician explicitly stated that treatment of the nonpain condition would also treat the patient's pain.

The CPCS contains a minor exception related to treatments for depression and anxiety. As with all other nonpain topics, discussions of depression and anxiety are not considered pain-related (and therefore are not coded) unless participants explicitly state that treatment for these conditions would also treat pain. However, patient requests and clinician recommendations for depression and anxiety treatments (but not general discussions of anxiety or depression) are always coded and are assigned a separate subcategory (see Tables 1 and 2). We made this exception for several conceptual and practical reasons. Chronic pain and depression frequently co-occur [48], and treatment of depression and/or anxiety is a critical component of chronic pain management [49]. Therefore management of anxiety and depression can reasonably be considered pain-related for all transcripts. In addition, many treatments can be prescribed either for chronic pain, for depression, or for both conditions (e.g., tricyclic antidepressants, cognitive behavioral therapy). During coding, we found that patients and clinicians often discuss these "dual-purpose" treatments without specifying whether they are being used to treat pain, depression, or both. Therefore, to enable reliable coding, medications approved primarily to treat anxiety or depression (e.g., selective serotonin reuptake inhibitors) are classified as treatments for anxiety or depression regardless of how the medications were discussed during visits.

Final Coding System

Tables 1 and 2 show the major categories and subcategories contained in the final coding system. The CPCS comprises major categories based on speaker (patient versus clinician) and communicative function (purpose). Discussion of opioids was coded separately and in greater detail than was discussion of other pain treatments because opioids are often at the root of disagreements related to chronic pain [11]. Major categories for patient utterances include evaluation or description of pain, requests for clinician action, requests for information (i.e., questions), evaluation of non-opioid pain treatments, evaluation of opioids, and responses to clinician recommendations. Major categories for clinician utterances include patient-centered communication (e.g., eliciting a patient's perspective on pain or pain treatment), treatment recommendations, evaluation of non-opioid pain treatments, evaluation of opioids, and responses to patient requests for actions. The definition of patient request for action includes indirect or implied requests [50,51] using an approach similar to the one used in the Taxonomy of Patient Requests coding system [52]. In contrast, the definition of clinician recommendations includes only explicit recommendations.

Patient and clinician responses are coded only if they correspond to a previously coded clinician recommendation or patient request for action, respectively. Coded responses can immediately follow a request/recommendation or be separated from the request/recommendation by multiple intervening utterances. Responses are further subcategorized as either agreement, suggesting an alternative action, or disagreement/resistance. A fourth response category, conditional agreement (e.g., "I'll agree to X if you do Y"), was almost never coded and so was dropped from the final coding system. We found that reliably coding more fine-grained response subcategories (e.g., distinguishing passive patient resistance from disagreement [53,54]) was difficult using transcripts alone.

Table 1 Coding categories for patient utterances

Major category	Subcategories	Example	Count	Kappa
Patient evaluation or description of pain	Positive assessment, including improving pain	My arthritis seems to be doing okay, doc.	43	0.66
	Negative assessment, including worsening pain or emphasis on pain severity	I'm having therapy and I'm in just real bad pain.	122	0.62
	Neutral description of pain	I have a constant burning in my throat.	157	0.63
Request for clinician action	Non-opioid pain treatment	Now, she said I need a referral from you.	31	0.57
	Diagnostic test	I don't know if . . . I can get scheduled for an MRI or something.	5	0.91
	Decreased opioid dose	maybe we could cut the night [dose] down.	8	0.36
	Increased opioid dose	Is there any way that you can up the quantity so I don't have to go 4 or 5 days without?	8	0.53
	Refill or same opioid dose	I need [the Norco] in the summer refilled.	19	0.54
	Change to a different opioid	What about the [Fentanyl] patches?	9	0.24
	Anxiety or depression treatment	. . . if you could get me a small amount of [Clonazepam]—	15	0.78
	Nonspecific, logistic, or other request	So how can we fix me?	35	0.29
Request for information		Does it look like it's a tendon or a muscle or cartilage?	122	0.73
Evaluation of non-opioid pain treatment	Positive assessment of non-opioid treatment	She did the ultrasound therapy, which helped a lot.	41	0.65
	Negative assessment of non-opioid treatment	And that [ibuprofen] didn't help with the headaches.	53	0.77
	Uncertainty about non-opioid treatment	I had no other choice but let [meditation] try.	8	0.31
Evaluation of opioid pain treatment	Positive assessment of opioid treatment	[Tylenol with codeine] takes [the pain] right away.	26	0.31
	Negative assessment of opioid treatment	I'm sick of this morphine.	45	0.64
	Uncertainty about opioids	The [fentanyl] patch, I don't know what it does.	12	0.50
	Discussion of potentially dangerous opioid side effects (respiratory depression, drowsiness, addiction)	Are [these pills] addictive?	46	0.40
	Discussion of other opioid side effects (tolerance, constipation)	I had to start taking a stool softener.	23	0.65
	Opioid-related threats	I do not feel like changing my medical [provider] . . .	6	0.60
Response to clinician recommendation	Resistance/denial	Well, I don't know. What is it for?	26	0.53
	Suggest alternative	I say let's see if the medicine works.	7	0.00
	Agreement	Okay. Sounds good.	164	0.51
Other pain-related utterance		I mean, it could be a lot of things.	2747	0.84
Patient companion utterance tag			177	0.85

Table 2 Coding categories for clinician utterances

Major category	Subcategories	Example	Count	Kappa
Patient-centered communication	Eliciting patient's perspective about pain	Well, how's your pain doing?	43	0.68
	Eliciting patient's perspective about pain treatment	Did [therapy] make a difference with your back?	87	0.64
	Supportive/empathetic statements	I know you're frustrated about this.	50	0.59
Clinician recommendations	Non-opioid treatment	I would like for you to go to the gym.	111	0.45
	Diagnostic test	Okay. So, let's get an x-ray.	14	0.74
	Opioid dose increase	So maybe should we go to 20 milligrams . . .	13	0.58
	Opioid dose decrease	You have to wean yourself off that to start with.	13	0.42
	Change to a different opioid	So I think we're gonna do 15 mg, 3 times a day.	25	0.47
	Refill or same opioid dose	It's time to refill the codeine.	13	0.53
	Anxiety or depression treatment	You want to try to get Cymbalta?	65	0.60
Evaluation of non-opioid pain treatments	Positive assessment of non-opioid treatment	The more mobile you are, the better.	50	0.52
	Negative assessment of non-opioid treatment	[Gabapentin] does not fix you.	23	0.59
	Uncertainty about non-opioid treatment	I'm not terribly sure how much ibuprofen is gonna help.	9	0.37
Evaluation of opioid pain treatments	Positive assessment of opioid treatment	[Darvon] works long term when used intermittently.	23	0.40
	Negative assessment of opioid treatment	you really need to work on trying to find non-narcotic . . . to help control the pain.	14	0.46
	Uncertainty about opioids	it's hard to know if any given one [of these pills] is gonna make much difference.	10	0.33
	Discussion of potentially dangerous opioid side effects (respiratory depression, drowsiness, addiction)	The narcotics, they can make you drowsy.	55	0.62
	Discussion of other opioid side effects (e.g., tolerance, constipation)	You're gonna need more [narcotics] as time goes on.	56	0.49
Response to patient request for action	Resistance/denial	Well, you can't start with a high dose.	21	0.70
	Suggest alternative	Have we tried Kadian with you before?	16	0.24
	Agreement/fulfillment	Okay. We'll do it that way.	52	0.55
Other pain-related utterance		So you take that as needed as well?	3209	0.88
Clinician companion utterance tag			25	0.91

The CPCS allows a single utterance to be assigned to more than one major category when appropriate, because a single utterance can perform multiple functions simultaneously [55]. With the exception of patient requests for information, each utterance is assigned to one and only one subcategory within each major category. Utterances by third parties (e.g., spouse, medical student) are coded in the same way as patient or companion utterances and are given an additional companion tag to indicate that the utterance was made by a third party. In addition, patient and clinician utterances that are pain-related but do not meet criteria for any other major category are assigned default codes. This approach facilitates the use of utterance counts to

measure the duration of pain-related discussions and the ratio of patient to clinician talk. To reduce coders' cognitive load, backchannels (brief listener responses indicating attention, e.g., "uh huh") and incomplete utterances are assigned default codes. Two major categories—explicit assessments of the communication process and of decision-making quality—were rarely coded; these categories were thus dropped from the final coding system and are not discussed further. The complete coding manual is available online (see Appendix).

Coding System Application and Analysis

Two authors (MC and SGH) independently applied the final coding system to all transcripts in the final sample. Coders first identified all pain-related utterances in a transcript and then assigned codes to each pain-related utterance. Disagreements were resolved by discussion after each step. Coders met regularly to review results and to avoid coder drift. Intercoder agreement for each step was calculated prior to discussion using Cohen's kappa [56].

Coding frequencies were analyzed using descriptive statistics. We calculated the frequency of patient and clinician responses (i.e., no response, agreement, suggest alternative, or resistance/disagreement) separately for opioid-related and non-opioid related utterances in order to evaluate whether response patterns differed for these two categories.

To evaluate the construct validity of the CPCS, we analyzed associations between coding frequencies and relevant variables collected as part of the parent study. We tested the following specific hypotheses about the relationship between patients' baseline pain interference and coded utterances:

H1a. Greater baseline pain interference (measured by the single SF-12 pain item) will be associated with longer discussions about pain (measured by the number of pain-related utterances in each transcript).
H1b. Greater baseline pain interference will be associated with more frequent patient negative assessments of pain.
H1c. Greater baseline pain interference will be associated with more frequent pain-related patient requests for action.

We advanced H1a because prior research has shown an association between pain severity and time spent discussing pain [4,57]. Although no prior studies have directly measured the associations posited in either H1b or H1c, we advanced these hypotheses because we expected that patients experiencing greater pain-related interference would be more likely to make negative evaluations of their pain (e.g., express negative emotion due to pain or describe worsening pain severity) and to request clinician action.

For each hypothesis, we conducted a separate regression with coding (or utterance) frequency as the dependent variable and pain interference as the independent variable. We did not analyze specific request subcategories separately because many subcategories occurred infrequently (see Table 1). We performed Poisson regression with robust standard errors and used mixed-effects models to account for patients being nested within clinicians. Use of robust standard errors provides accurate point estimates for modeling count data without the stringent assumptions required for standard Poisson regression [58]. Regression assumptions were checked by visual inspection of residuals plotted against predicted means.

We also tested three hypotheses related to clinician-reported visit difficulty. Visit difficulty was measured by adding together the three postvisit questions related to visit difficulty to generate a 7-point summated rating scale. Summated rating scales are combinations of related ordinal measures that have the properties of continuous measures [59]. Cronbach's alpha for the three items was 0.75. We performed exploratory factor analysis and evaluated item-rest plots to verify that the three items assessed a single construct and met the empirical requirements for valid summated rating scales [59]. Our three hypotheses related to visit difficulty were as follows:

H2a. Patient resistance/disagreement with clinician recommendations will be associated with greater visit difficulty.
H2b. Patient requests for action will be associated with greater visit difficulty.
H2c. Longer discussions (measured by the sum of patient and clinician utterances) about opioid risks and side effects will be associated with greater visit difficulty.

Most research on predictors of difficult visits has focused on patient or clinician characteristics [35,60]; surprisingly few studies have examined visit content. We advanced H2a because prior studies have found that clinicians treat patient acceptance of treatment recommendations as necessary for successful visit closure [46]. Patient resistance or disagreement is therefore likely to increase clinicians' perception of visit difficulty. We advanced H2b because two prior studies found that patient requests for diagnostic tests were associated with more difficult visits [39,44]. As noted above, request subcategories (such as requests for diagnostic tests) were too infrequent to analyze separately; therefore, we analyzed patient requests for action as a group. Finally, we hypothesized that, even though patients and clinicians often agree on treatment plans by the end of a visit [8], discussion of opioid risks would be associated with greater visit difficulty (H1c) given how frequently clinicians report this topic as contentious [11].

For each of these three hypotheses, we conducted a linear regression with clinician-reported visit difficulty

Table 3 Patient characteristics

	Patients ($n = 45$)		Clinicians ($n = 33$)	
Age, years (SD)	52.7	(10.7)	44.5	(6.5)
Male sex, n (%)	22	(48.9)	13	(39.4)
Race,* n (%)				
White, non-Hispanic	25	(55.6)	16	(50.0)
Black, non-Hispanic	9	(20.0)	1	(3.1)
Hispanic	7	(15.6)	4	(12.5)
Asian/Pacific Islander	1	(2.2)	9	(28.1)
Other	3	(6.7)	2	(6.3)
Income, n (%)				
$<$ 20K	17	(37.8)		
20K–35K	9	(20.0)		
35K–75K	8	(17.8)		
75K–120K	8	(17.8)		
$>$ 120K	3	(6.7)		
Education, n (%)				
High school graduate	9	(20.0)		
Some college	25	(55.6)		
College graduate	11	(24.4)		
Pain interference,† mean (SD)	4.1	(1.1)		
SF-12 mental health composite,‡ mean (SD)	45.5	(11.2)		
SF-12 physical health composite,‡ mean (SD)	26.0	(10.2)		
Clinic type, n (%)				
Community primary care	19	(42.2)		
Academic primary care	18	(40.0)		
VA primary care	7	(15.6)		
Urgent care	1	(2.2)		
Sex concordant visit, n (%)	22	(48.9)		
Race concordant visit, n (%)	23	(51.1)		
Visit difficulty,§ mean (SD)	3.9	(1.4)		

*One missing value for clinicians.
†SF-12 pain interference item; range 1–5; higher = greater interference.
‡Range 0–100; higher = better health.
§Range 0–6; higher = more difficult.

(measured as a continuous variable with range 0–6) as the dependent variable and coding frequency as the independent variable. For H2c, we used the sum of the subcategories for patient and clinician discussion of serious and nonserious opioid side effects as the independent variable. We used mixed-effects models to account for patients being nested within clinicians. Regression assumptions were checked by inspecting residual plots.

Results

As shown in Figure 1, 45 visits involving 33 different primary care clinicians (21 general internists and 12 family physicians) met criteria for inclusion in the final sample. Table 3 shows detailed participant characteristics.

Intercoder Agreement

Intercoder agreement for identifying pain utterances was 0.72. Tables 1 and 2 show the frequency and intercoder agreement for each subcategory code in the final coding system. Landis and Koch proposed the following interpretation of kappa: 0.2–0.4 indicates fair agreement; 0.4–0.6, moderate; 0.6–0.8, substantial; and 0.8–1, near perfect [61]. By this metric, intercoder agreement for major coding categories was moderate to substantial ($\kappa = 0.5$–0.7). Agreement for individual subcategories varied but was generally moderate; similar levels of intercoder agreement have been documented in other detailed coding systems [41]. Agreement was fair for a few subcategories; most of these subcategories occurred infrequently, and kappa can be difficult to interpret for rare events [62]. All coding disagreements in our sample were resolved through discussion, which increases reliability of the final data.

Characterizing Pain-Related Communication

Median total visit length was 475 utterances (Interquartile range 390–604). The median number of

Table 4 Characterization of patient and clinician responsees

	Patient responses to clinician recommendations		Clinician responses to patient requests for action	
Response, *n* (%)	non opioid	opioid related	non opioid	opioid related
None*	47 (25%)	16 (25%)	32 (37%)	15 (34%)
Resist/disagree	16 (8%)	5 (8%)	10 (11%)	5 (11%)
Suggest alternative	5 (3%)	1 (2%)	8 (9%)	3 (7%)
Agree	121 (64%)	42 (66%)	37 (43%)	21 (48%)
Total	189 (100%)	64 (100%)	87 (100%)	44 (100%)

*Indicates clinician recommendations or patient requests for action for which no corresponding response was coded. When different responses to the same recommendation or request were coded, results were classified according to the most agreeable response type.

pain-related utterances per visit was 136 (IQR, 86–247), and the median proportion of all visit utterances that were pain-related was 28% (IQR 18%–48%). The distribution of pain-related utterances and codes was positively skewed, with five transcripts containing >300 pain-related utterances. Eleven visits included patient companions (e.g., spouse). Visits contained a median of two pain-related patient requests for clinician action (mean 2.9), one pain-related patient request for information (mean 2.7) and three pain-related clinician recommendations (mean 5.6). The most common subcategories for patient requests for action and clinician recommendations were nonspecific requests and non-opioid treatments, respectively. Requests and recommendations subcategorized as anxiety and depression treatments were fairly common; most of these were explicitly linked to pain management by patients or clinicians.

Patients requested an opioid dose increase in four visits, an opioid dose decrease in four visits, and both an increase and decrease in one visit. Clinicians recommended an opioid dose increase in six visits, an opioid dose decrease in seven visits, and both an increase and decrease in one visit. Table 4 shows the proportion of response types (no response, resist/disagree, suggest alternative, or agree) for patient requests for action and clinician recommendations, stratified according to whether requests involved opioids. Patients agreed with 64% of clinician recommendations, while clinicians agreed with 44% of patient requests for action. For both patients and clinicians, the proportion of response type was similar regardless of whether the initial recommendation (or request) was related to opioids (Table 4).

Associations with Pain Interference

Table 5 presents regression results for the hypotheses we tested to evaluate the construct validity of our coding system. For hypotheses relating to pain interference, we found support for H1a (i.e., greater pain interference was associated with longer discussions about pain) and H1c (i.e., greater pain interference was associated with more patient requests for action). For H1a, the incidence rate ratio (IRR) of 1.51 indicates that a 1-point increase in the 5-point pain interference measure is associated with a 51% increase in the number of pain-related utterances. In contrast, H1b was not supported; the association between pain interference and patient negative assessments about pain was in the hypothesized direction but was not statistically significant.

Visit Difficulty

For hypotheses related to clinician-reported difficulty, we found support for H2a (i.e., frequency of patient resistance to/disagreement with recommendations was associated with greater visit difficulty). Each additional utterance coded as a patient resistance or disagreement was associated with a half-point increase in the 7-point summated rating scale of visit difficulty (Table 5). We also found support for H2c (i.e., length of discussion of opioid risks and side effects was associated with increased visit difficulty), though the effect size was small and barely significant. In contrast, H2b was not supported; the association between patient requests and visit difficulty was in the expected direction but did not reach statistical significance.

Discussion

This article describes development and initial application of the CPCS, the first coding system designed to systematically characterize patient-clinician discussion about chronic pain and opioids. The CPCS builds on strengths of existing interaction-based coding systems while capturing additional detail about pain-related communication likely to influence postvisit agreement, perceptions of visit difficulty, and changes in opioid dosing. Like the Taxonomy of Patient Requests [52], Street's patient involvement coding system [40], and the Verona Coding system for emotional sequences [37,38], the CPCS captures both content and communicative function. Unlike those systems, coding categories are tailored to discussions about chronic pain rather than to communication in general. Coding system development

Table 5 Results of hypothesis testing*

Hypothesis	Regression results		
Associations with baseline pain interference	**IRR†**	**95% CI**	***P*-value**
H1a. Greater baseline pain interference will be associated with longer discussions about pain.	1.51	1.12–2.04	0.007
H1b. Greater baseline pain interference will be associated with more frequent patient negative assessments of pain.	1.34	0.90–2.02	0.15
H1c. Greater baseline pain interference will be associated with more pain-related patient requests for action.	1.32	1.04–1.67	0.02
Associations with visit difficulty	**Coefficient‡**	**95% CI**	***P*-value**
H2a. Frequency of patient resistance/disagreement with clinician recommendations will be associated with visit difficulty.	0.54	0.18–0.90	0.003
H2b. Frequency of pain-related requests for action will be associated with visit difficulty.	0.11	−0.02–0.24	0.11
H2c. Length of discussion of opioid risks & side effects will be associated with visit difficulty.	0.07	0.00–0.15	0.049

*Each row represents a separate bivariate regression; all results are adjusted for clustering of patients within clinicians.
†IRR = Incidence rate ratio, the exponentiated form of the Poisson regression coefficient.
‡Linear regression coefficient.

requires tradeoffs between capturing general communication behaviors, such as patient questions, and topic-specific communication, such as discussions of opioid side effects. We sought to strike a balance by including important communication elements found in other coding systems while focusing on the nuances of clinical discussions about opioids, which play a key role in disagreements about chronic pain.

The CPCS has potential to help researchers fill important gaps in our knowledge of patient-clinician communication about chronic pain because it combines advantages of traditional quantitative and qualitative approaches to analyzing data from direct observation of clinic visits. Existing quantitative research on this topic has analyzed factors associated with the length of pain discussions [4,57] and has compared visits in which pain was discussed to visits in which it was not [19,63,64]. Such analyses are unlikely to provide detailed insights about how to improve communication. Qualitative studies have reinforced the importance of the therapeutic relationship [16] and identified common sources of disagreement related to chronic pain and opioids [11,65], but they provide no data on prevalence or frequency of communication patterns. Systematic coding of communication and patient-clinician exchanges allows both detailed description of pain-related communication and analysis of associations between communication patterns, postvisit perceptions, and health outcomes.

Findings from this initial application of the CPCS provide preliminary evidence of the coding system's reliability and construct validity. Intercoder agreement was comparable to that of other published coding systems. Four of the six hypotheses advanced to assess construct validity were supported. The effect sizes for hypotheses H1a (i.e., association between pain interference and length of pain-related discussions) and H2a (i.e., association between patient disagreement and visit difficulty) are likely to be clinically meaningful. One possible explanation for the lack of support for H1b (i.e., association between pain interference and negative pain assessments) is that patients with chronic pain may censor disclosures about their pain in order to present themselves as more credible patients [18,66]. We know of no prior studies that have examined associations between patient resistance/disagreement and clinician-reported visit difficulty, though this finding is consistent with prior studies based on questionnaire data [67]. Of course, results should be considered preliminary due to the small sample size and the paucity of pain-related variables available in the parent study.

The CPCS does have some limitations. The coding system was developed from transcripts, so coding categories focus on verbal communication and may not capture some subtle, potentially important aspects of communication about pain. For example, patients sometimes respond to clinician recommendations with "passive resistance" conveyed primarily through paralinguistic or nonverbal means (e.g., pauses, half-hearted agreement) [53,54,68]. Future studies applying the CPCS directly to audio or video recordings may allow coders to distinguish explicit disagreement from passive resistance. We also found that the coding exception for depression and anxiety treatments made coding more complicated without providing much additional information. The exception did not meaningfully change the total number of utterances coded (and therefore that were counted as pain-related) for each transcript

because it related only to requests and recommendations, not to other categories of utterances. In addition, in our sample, the majority of discussions about depression and anxiety treatment were explicitly discussed as pain-related by participants and so would have been coded anyway. Therefore, we plan to drop this exception in a future revised version of the CPCS.

Despite these limitations, our coding results do provide some new information about opioid-related discussions in primary care. Only 20% (n = 9) of visits included patient requests for opioid dose changes, with five visits containing requests for dose increases and five visits containing requests for dose decreases (one visit contained requests for both a dose increase and a dose decrease). Clinician recommendations for opioid dose changes were also evenly divided between dose increases and dose decreases. These findings provide no evidence that discussions about opioids are marked by frequent patient requests for dose increases, or that proposals for dose increases are primarily initiated by patients. We also found that the distribution of response types (i.e., agreement versus resistance/disagreement) did not differ for opioid-related versus non-opioid related patient requests or clinician recommendations (Table 4). These findings suggest that negotiations about opioids involve no more frequent disagreements than do discussions about other pain-related topics, at least in primary care. Although we used data from a study about depression, our findings are likely to generalize to other primary care populations because our sample selection process was independent of depression status and almost all primary care visits involve discussion of multiple topics [47]. In contrast, our results may not generalize to other settings, such as specialty pain clinics.

If confirmed by future studies, these descriptive results raise the possibility that typical patient-clinician negotiations about opioids do not involve unusually high levels of disagreement or frequent patient demands for more opioids. Reports of frequent opioid-related disagreements and clashes with "drug-seeking" patients [7–9,11,22] may be driven instead by a few highly salient negative interactions involving dismissive clinicians or demanding patients. This interpretation has been suggested in prior studies [17,69] and is consistent with data showing that high-risk opioid consumption is concentrated among a small minority of high-risk patients [70]. On the other hand, one recent study found that patients displayed significantly greater emotional arousal during discussions of pain compared with discussions of other topics [71]. Another possible explanation for our findings related to resistance/disagreement is that strong social pressures to maintain polite discourse [20] and minimize disagreement [72,73] during clinic visits make overt conflict rare even for contentious topics such as opioids.

Resolving these important questions will require additional research involving systematic coding and analysis of actual patient-clinician discussions about pain and opioids. Questionnaires and interviews are invaluable for documenting patient and clinician perspectives; analysis of direct observation data augments these methods by allowing investigation of what patients and clinicians actually do and say during clinic visits. The CPCS offers researchers a tool for systematically analyzing patient-clinician negotiations about opioids and chronic pain management that they can use to advance knowledge of this important clinical topic.

Although the CPCS provides an important tool for investigating and potentially improving communication about chronic pain and opioids, additional research is needed on several fronts. In addition to limitations related to small sample size, the SF-12 measure of pain interference has poor responsiveness compared with other pain assessment tools [74]. As mentioned previously, both the coding system and the associations reported in this study need to be tested using larger datasets that include more pain-specific variables to ensure that the coding system is valid in other populations. Utterances can be considered the "building blocks" of patient-clinician communication, but understanding aspects of the clinical negotiation that foster appropriate opioid prescribing also requires analysis of larger scale communication patterns, such as turn-taking patterns and sequences and interaction phases [75] associated with opioid dose changes. Finally, similar communication behaviors can have different meanings depending on their context, so data from direct observation of patient-clinician communication complement but do not obviate the need for additional data from questionnaires and interviews focused on patients' and clinicians' thoughts and perceptions related to communication about chronic pain.

Communication during clinic visits plays a major role in opioid prescribing decisions. The CPCS appears to be a reliable, valid tool researchers can use to investigate pain-related communication in order to identify strategies associated with appropriate opioid prescribing and effective therapeutic patient-clinician relationships.

Supplementary Data

Supplementary Data can be found online at http://painmedicine.oxfordjournals.org/.

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