

# Incidence and Risk Factors for Progression From Short-term to Episodic or Long-term Opioid Prescribing: A Population-Based Study

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## Abstract

**Objectives:** To determine what proportion of a geographically defined population who receive new opioid prescriptions progresses to episodic or long-term patterns of opioid prescribing and to explore the clinical characteristics associated with patterns of opioid prescribing.

**Patients and Methods:** Population-based drug prescription records for the population of Olmsted County between January 1 and December 31, 2009, were obtained using the Rochester Epidemiology Project medical records linkage system (N=142,377). All medical records were reviewed for a random sample of 293 patients who had a new (“incident”) prescription for an opioid analgesic in 2009. Patients were followed through their medical records for 1 year after their initial prescription date, with patterns of opioid prescribing categorized as short-term, episodic, or long-term.

**Results:** Overall, 293 patients received 515 new opioid prescriptions in 2009. Of these, 61 (21%) progressed to an episodic prescribing pattern and 19 (6%) progressed to a long-term prescribing pattern. In multivariable logistic regression analyses, substance abuse was significantly associated ( $P<.001$ ) with a long-term opioid prescribing pattern as compared with an short-term opioid prescribing pattern. Past or current nicotine use ( $P=.03$ ) and substance abuse ( $P=.04$ ) were significantly associated with an episodic or long-term prescribing pattern as compared with a short-term prescribing pattern.

**Conclusion:** Knowledge of the clinical characteristics associated with the progression of a short-term to an episodic or long-term opioid prescribing pattern could aid in the identification of at-risk patients and provide the basis for developing targeted clinical interventions.

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Accidental overdose related to the use of long-term opioid therapy for non-cancer pain has emerged as a major threat to US public health.<sup>1,2</sup> As a result, there is an urgent need to better understand patterns of opioid prescribing. Our previous work reported that 12% of the population of Olmsted County, Minnesota, received a new prescription for opioids in 2009; opioids were the third most frequently prescribed drug in this geographically defined population that included both insured and uninsured patients.<sup>3</sup> The Consortium to Study Opioid Risks and Trends (CONSORT), supported by the National Institute of Drug Abuse, was initiated to identify trends and risks associated with long-term opioid therapy for chronic pain.<sup>4</sup> In this work, 3 opioid prescribing patterns were defined: short-term, episodic, and long-term use.<sup>4</sup> Reports from this valuable work

focus on the prevalence and incidence of long-term use as well as on comparing prescribing patterns between those who do and do not have conditions such as depression and substance abuse disorders.<sup>5-8</sup>

With some exceptions, physicians and other health care professionals with prescribing authority generally do not plan that an initial opioid prescription will presage the need for repeated opioid prescriptions. No information is available on characteristics associated with the transition from shorter-term to longer-term opioid use; that is, when opioids are first prescribed, which patients are more likely to eventually receive repeated prescriptions? Indeed, there are no longitudinal studies that follow patients who are initially prescribed opioids. Better understanding of these characteristics would

help guide efforts to optimize the use of opioids and anticipate the potential for episodic or long-term use when the decision is made to initially prescribe opioids.

The objectives of this study were (1) to determine what proportion of a geographically defined population receiving new (“incident”) opioid prescriptions progress to episodic or long-term opioid prescribing patterns and (2) to determine the associations between patient characteristics and the transition from short-term to episodic or long-term prescribing patterns, as defined by the CONSORT classification. To accomplish these objectives, we used a cohort of patients receiving opioids previously identified using the Rochester Epidemiology Project (REP), a medical records linkage system that captures all health care information for the residents of Olmsted County.<sup>9-11</sup>

## PATIENTS AND METHODS

All individuals residing in Olmsted County on April 1, 2009, were identified using the REP census (N=142,377).<sup>9</sup> Past work shows that the total number of people identified by the REP for the study period represented 98.7% of the population predicted to reside in Olmsted County by the US Census, and the age and sex distributions were virtually identical to those of the US Census estimates.<sup>10</sup> Additional details about the population of Olmsted County and about the REP have been published elsewhere.<sup>9,11,12</sup>

Outpatient drug prescriptions written for these individuals from January 1 through December 31, 2009, were obtained from Mayo Clinic and the Olmsted Medical Center (both in Rochester, Minnesota). These 2 institutions provide most of the medical care for Olmsted County residents.<sup>9-12</sup> Since 2002, both institutions have used proprietary electronic prescription systems in their outpatient settings (ie, office and hospital outpatient settings). Electronic prescriptions in 2009 were retrieved from the proprietary systems and were converted into RxNorm codes retrospectively.<sup>13</sup> The prescriptions were then grouped using the National Drug File—Reference Terminology classification system.<sup>13,14</sup> We included all prescriptions in the opioid analgesic drug class. These medications included all formulations of oxycodone, morphine, hydromorphone, oxymorphone, hydrocodone, fentanyl, meperidine, codeine, and methadone.

Patients eligible to be sampled for this analysis included all individuals who received a new prescription (no opioid prescriptions in the previous 6 months) for an opioid analgesic (n=14,869) and patient authorization for use of their medical records for research purposes. Full chart reviews by nurse abstractors were conducted on the random sample of 299 patients. Of these, 293 (98%) had a confirmed new (incident) prescription for an opioid analgesic.

## Demographic and Clinical Characteristics

Data abstracted from the medical records included indication for first prescription, age, sex, race, years of education, tobacco use status (never, past, and current), current or past diagnosis of depression, anxiety, other psychiatric disorders, or substance abuse. The presence of comorbid medical problems was identified including cardiovascular diseases (eg, myocardial infarction, congestive heart failure, and peripheral vascular disease), neurological disorders (eg, cerebrovascular disease, hemiplegia, and dementia), chronic pulmonary disease (eg, chronic obstructive pulmonary disease, and asthma), diabetes mellitus, renal disease, liver disease, peptic ulcer disease, connective tissue or rheumatic diseases (eg, rheumatoid arthritis), human immunodeficiency virus/acquired immunodeficiency syndrome, and neoplastic disease. Using diagnosis codes from 2005 to 2009, the Charlson Comorbidity Index (CCI) was calculated, including weighted scores for (1) disease severity and (2) disease severity and age.<sup>15,16</sup>

## Categorization of Opioid Prescribing Patterns

Opioid prescribing patterns were classified into 3 groups based on categories defined by the CONSORT study. The CONSORT study was conducted in 2 large integrated health plans (Kaiser Permanente Northern California and Group Health Cooperative Washington State) to study trends in long-term opioid therapy for noncancer chronic pain from 1997 to 2005.<sup>4</sup> Patients were followed for at least 1 year past their initial prescription date to identify all subsequent opioid prescriptions. Episodes of opioid prescribing that lasted 90 days or less were classified as *short-term*. Episodes of opioid prescribing lasting longer than 90 days were classified as *episodic* if the total days supply was less than 120 and the total

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